BOOSTING the top end of its Level 6 minicomputer family, Honeywell has introduced the Model 57 which is software compatible with existing Level 6 minis. At the same time the smallest Level 6 machine, the Model 36, has been replaced by the Model 33. Prices for Model 33 and Model 57 start £4,000 £31,000

## **UK** subsidiary

THE US company that manufactures the Basic/Four multi-terminal commercial system, Management Assistance Inc. of California, has established a wholly owned UK subsidiary by purchasing the firm that has been distributing its systems here since early last year, Basic/Four (UK) Ltd

## Wanted: Inmos

GREATER Manchester has joined the growing list of regio nal authorities staking a claim for Inmos, the NEB's fledgeling semiconductor company. Voiced by the North West Industrial Development Association, the claim is based on the region's existing experience in the field, with companies like ICL, IBM, NCR, Honeywell and Ferranti already established in

## Gray power in UK

ONLINE access to a Cray-1 vector processor is now available in the UK via the LUCS bureau's parent company, United Computing Systems Inc of Kansas City. Meunwhile Cray Research has received an order for an \$8.8 million Cray-1 from AT&T subsidiary Bell Labs for installation at its Murray Hill, New Jersey plant in 12 months' time.

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rather sceptical about the pros-

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# O1-952 8471 UK first choice for new investment'—NCR boss

**Qume launches double** 

SHORTLY after news that it is Trak drive has consistently

likely to be taken over by ITT passed more than 100,000 "taps"

tracks.

density diskette drive

From Louise Keyhoe in California

"I cannot see automatic de-

biting appealing greatly to the consumer because his bank

account would be debited

directly and immediately from

would lose the advantage of float.

that consumers use for payment

at the moment cost them no-

thing so why should they bother

(CW September 28) Qume has

entered the disc drive market

with a dual sided double density

diskette which it is to manufac-

ture under licence from YE Data

Qume claims to have over-

ow up with a 5¼ inch drive in

come the media wear problem

which have dogged dual sided

with automatic debiting?"

"In addition, the cheques

the terminal in the shop so he

DESPITE the cutbacks in its workforce being made by NCR automatic debiting, catching on workforce being made by NCR automatic det at its Dundee factory due to in a big way. changes in technology the company's president, Charles Exley, favours Dundee as the location for any new European manufacturing facilities that may be required by NCR in the

Exley told Computer Weekly: "If we needed to expand our manufacturing capability in Europe we would invest in the UK. One reason is that we consider labour relations to be good in the East of Scotland."

Exley pointed out that the Dundec plant is now manufacturing NCR machines ranging in size from the 8200 series of interactive multi-terminal business systems up to the 8500 series of medium scale mainframes. But he confirmed that Dundee will not build the 8600 series of large scale mainframes which will soon be competing with systems as powerful as the IBM 3033.

The 8600 is expected to be announced before the end of this year and Exley freely admitted that NCR had lost some big customers in the past through not being able to offer them the capability to upgrade to a large scale mainframe.

disc technology, and expects to have its Data Trak 8, eight inch Looking at word processing, a drive in volume production early growing market not yet exnext year. The company will ploited by NCR, Exley said that his company had no plans yet to the second quarter of 1979. move into the word processing Qume is already sampling the business, and stated frankly: Data Trak 8 to unnamed OEM "We do not understand the requirements of the market and Data Trak 8 stores 1.6 Mbytes of unformatted data and 1.2 in any case we are too busy with other things at the moment. But word processing undoubtedly

Mbytes in IBM format and is compatible with existing drives. has great potential." Facit, which markets Qume The majority of NCR's busiprinters, it to discuss European ness comes from customers in marketing of the drive next retailing and banking, many of whom could be intimately involved with Electronics Funds Transfer Systems when and if they are implemented on a significant scale. But Exley is

Elliot Wasserman, Qume vice president of marketing, said that he expects Data Trak 8 to be used in a wide variety of systems. He suggested that they would be incorporated in word processors, test equipment, medical systems, and home computers as well as general data processing

"The Data Trak 8 introduction will mark the long awaited shift by word processor and small business system makers to the higher capacity drives", he

A double touch of luck

THERE'S more than a touch of home at Haydock Park at 33/1 to also carried by two recenorees owned by Henry's brother Biff, a

wholesaler and service call log-ging and supply companies set up by Henry Lewis. The names are day, Computercall continu for money is nothing new for X-Data, we lead the field in just living up to its name."



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Looking suitably thrilled by the presence of HRH Prince Charles are these ladles being safely held in check by the fence around one of the Cossor Elec-tronics' factories at Harlow, Essex. The four ladies are (from left) Dot Natt, "Flo" Dimeline, Mary Reed and Shashi Kunira.

Prince Charles visited Cosso last Thursday in order to pick up the information on the elec tronics Industry in readiness fo a meeting he attended the fol-lowing day of the Radio, Radar and Electronic Capital Goods Industrial Strategy Sector Working Party at the National Economic Devalopment Office.

## Thomson order

by electronically and mechanically controlling the head landing and take-off TO enhance its reservations and administration system, Thombination was attained - a fast son Holidays has ordered a Jacapproach and slow soft landing quard word processing system followed by a a slow take-off from Hallmark Computers of Chiswick, London.

Plessey has been developing

System X components at

Taplow, Berks and at Edge Lane

in Liverpool where the System X

building was occupied for two

weeks by workers protesting

against compulsory redundan-

cies (CW, October 12).

## Details of first System X sites

THE first two System X ex- munications suppliers, and changes to be ordered by the Post Office will be for Woodbridge in Suffolk and Baynards House in the City of London. The orders will be placed with one of the System X contractors early next year and have already been approved by Post Office

with no measurable degradation

of signal amplitude. Tap tests

indicate media wear caused by

repeated access at a single loca-

tion on the most frequently used

Low media wear was achieved

dynamics until the needed com-

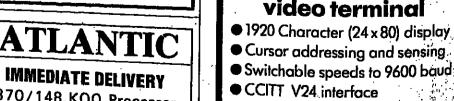
with rapid acceleration.

senior management Woodbridge will have a small 930 line exchange and Baynards House a junction tandem exchange to handle traffic between local exchanges.

Since mounting a display at Communications 78 in April the Post Office has let out very little information on System X, other than a rough schedule for its phased introduction between 1981 and 2010.

oted. Plessey, GEC and STC are the According to Qume, the Data Post Office's major telecom-

Last week X-Data romped



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Briefing

Software not

COMPUTER software is not ex-

cluded from the Queen's Award

to industry after all, according

to the office which administers

the scheme. It admits, though,

that confusion may have arisen

in the past from replies given to

intending or unsuccessful appli-

Association, whih wrote to the

Queen's Award Office to query

the policy (CW, September 28),

has been told that there is no

question of software being Ineli-

A THREE-MAN delegation from

the UK, headed by director-

general of the Computing Ser-vices Association Alan Ben-

jamin, is visiting Greece this week at the invitation of the

Greek government to discuss

the contribution the UK could

make to the development of the

Savings bank

challenge

Greek computing activities.

gible for the award.

Off to Greece

The Computing Services

excluded

# **US** court throws out appeals

THI: US Supreme Court h. Vashington has refused to her. appeals by Racal-Milgo on serv f its untitrust claims agains Western Electric regarding to connection of modems is

AT&T's telephone network. The district court, in rejetting the claims, held that Western Electric was immune to and trust laws because the FCCE exclusive jurisdiction over

The legal battle started in 15. when Western Electric as Milgo, claiming violation of patents on several modes Milgo countersued in April 18 asking \$44 million from Wester Electric as damages for brake antitrust laws by combin, with AT&T and Bell operation companies to buy Westen & tric modems exclusively a impose discriminatory tails non-Bell modems.

Non-Bell modems mus connected to the telephone work, according to Miggis "expensive and trops DAA data access at 🗐 for which the tariff 🕬 edly filed without FCC ##

reviewed until the rest of Miles

had been heard.

claims against Western Electric

A 110LD move by ICL to challings Philips, Datasash, Nixdorf and Olivetti in the savings bank tounter terminals market has won the company an order for some 200 terminals from the Anglia, Hastings and Thanet Building Society.

ICL's device is based on the 7500 cluster terminal system with a specially designed 480 character CRT terminal with may card reader and passbook. Western Electric di ta oppose the appeal because wants a once for all decisions the antitrust aspects of this which relate to more than ? suits now in process. mag-card reader and passbook tally roll printer from Okidate. The Supreme Court said the the rejected claims could not

## Telefile new chief

FOLLOWING a "greater deficit than expected" in the last finan-cial year, Telefile has made Hal Eden, previously vice-president of technology, the new chief executive of the company.

Telefile's first UK plug-compatible customer -- Back page.

## System 38 price

A LARGE configuration of UBM's new System 38 business computer is rather cheaper than the company first indicated. Having redone its sums, IBM now says that a System 38 with 30 displays, 10 printers, 1.5 30 displays, 10 printers, 1.5
Megabytes of main memory, 390
Megabytes on disc and two 650
April printers would cost A
E88,000, and not the £330,000
Stated last week (CW, October 26). The remail would be £7,200 a
month on a three year lease.

## Medical fears

IN TRYING to calm medical seas about the use of computers and a national child health care system, Social Services Secreary David Ennals has told the History David Ennals has told the History British Medical Association that the History British Medical Association that the History British Brit

THE Anti-Apartheid Movement, with support from the unions While agreeing that the requwithin ICL, has called for a full ests for the 2903s were made to inquiry into ICL's activities in ICL in the UK via ICL (Central South Africa, and asked the UK Africa) based in Salisbury, government to take positive ac-Rhodesia, ICL has said the ion to extend its arms embargo to include computers, similar to agreement was given Board of the US ban (see back page).

By means of its holdings in ICL, the AAM has also asked the Trade approval and that the machines were delivered directly to Malawi. And President Banda of Malawi has just

government to stall further exgiven ICL the go-ahend to set up pansion plans ICL may have. n new company in his country. ICL says its only contact with But ICL has denied that Malawi was being used as a "back door" to bust sanctions in Rhodesia, and that two 2903s

ICL (Central Africa) is to receive an annual visit from the Rhode-

sian chairman to discuss "personal matters" only.

In addition to the union bids

manufacturing capability in South Africa (see page 16).

Donald Cook

# VSPC users angry with

USERS of IBM's VSPC are angry that the company will not make available to them an enduser system that it offers both on the Call service and the newly announced Furnness VSPC serannounced European VSPC service, EPCS (Computer Weekly, IBI October 12),

recently sold to Malawi had

'disappeared", as alleged by the

Applications System (AS); a signed to protect its own bureau

The software in question is machines is thought to be detailed to be detailed.

IBM's refusal to sell the soft-ware for use on customer

series of integrated packages for services. Were independent bureaux to install the package, Turn to page 8:

to get ICL to disclose more in-

formation, including that con-

tained in an alleged secret list of

ICL computers being used for

classified applications in South Africa, the AAM has asked ICL

to publish a comprehensive list

of all its systems used by mili-

tary, police or other state agen-

cles; to suspend the supply and

servicing of computers to the

same parties; and to start a

policy of withdrawal from South

One of the effects of the US

embargo has been to stimulate

the growth of an indigenous

The chairman of the European

## COMPUTER WEEKLY'S INSIDE NEWS

MICRO UNIONS

Drions and the impact of the micro are increasingly being lifeked. One of the most active unionists in this area has been tan Banson, who explains this week why he believes training and nationalisation are his top priorities.

PROJECT GOSPEL

A BCB survey of users stame poor project menagament while Programmer Mater talls the gospel fruth.

Pages d/s

OPS TOPS

Users are urged to make a Relational Databases positive contribution to future Force Part 5 term developments and there is a New light on transmission further installment in out clicks. The Sales Sit sage in this week's lively letters.

ALSO
Computerview on loss of organitys jobs
(minor for Eristol?
Users his out

nard Allen, has been to see some Gilb's Mythodology operators taking one of the TOPS Prizzler Prizzler People and Events People and Events Letters to the Editor Micro Neigos Gilb's Mythodology People and Events People and Events

APPOINTMENTS-PAGES 23-56

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# 'Cross should have left earlier'—ICL chairman



Number 625

THE man who appointed Geoff Cross to head ICL, the company's chairman Tom Hudson, has said that he wished Cross had left the company a year before he did, last year,

Thursday, November 2, 1978

Speaking last week at a Press briefing to celebrate ICL's tenth anniversory, Hudson also re-opened a sore that has festered within ICL ever nce its inception when he declared that if he had been chairman in 1968 he would have killed the English Electric System 4 line, because of the failure of English Electric to provide adequate "organisational backing" for System 4. English Electric merged with ICT to form ICL.

Committee (CW, October 12) about ICL's slowness in repaying the £40 been million loan which Hudson said had able." been "extracted" from the government to help develop the 2900 series. ICL into the next decade, he said, was Hudson wryly commented that the £40 someone with a wider understanding million could be viewed as "a 50% of the computer industry and of marinstalment" by the government to cover the costs it had bequeathed to director, Dr Chris Wilson. ICL by what he obviously saw as a Full report on Hudson and Dr

The merger, he said, had cost ICL about £80 million in trying to create a unified organisational structure and tor in 1972, shortly after he himself had become chairman, Hudson said that In a pointed reference to recent for four years Cross had fulfilled the criticisms from the Public Accounts corporate need at that time and that his contribution to the company had been "essential, desirable and invalu-

But from 1976 the man suited to lead

# Blowing out the candles at ICL's tenth birthdey Press "party" last week is C o mp uter Weekly editor Weekly editor Walcolm Politi, watched by ICL chairman Tom Midson (laft)

By Cameron Davis in Washington, and Rory Johnston in London

CONTINUING its growth in the automated office and communications market, Xerox is likely to establish a new packet-switching network in the US — but it has decided to abandon plans for establishing a large European research centre in Milton Keynes to study the development of advanced copiers and other projects related to office automation. 'Probe Itl in S Africa' call

The official reason given for

the closure of the Milton Keynes site is that the number In the US the packet switched network would represent a of staff employed is lower than significant further step for originally planned. But it is Xerox in its moves to gain a large share of the burgeoning known that there has been con-

electronic office and information systems man let. To sharpen its focus on these markets, the company recently established a new organisation Xerox Business Systems, to deal with all products that are not copier/duplicators - namely word processors, facsimile and non-impact printers, such as the

siderable rivalry between the various research laboratories in the Xerox organisation on both sides of the Atlantic, and it app ears that the centres in Palo Alto and Los Angeles have won out in the struggle for some of the work Milton Keynes was doing. The 450 staff who are already in temporary accommodation in Milton Keynes are to be moved

9700 fast laser printer for comover the next year back to Welwyn Garden City, the town Turn to page 8

The world Lexistron. processor that even attempt can use. The word LEXITRON. processor that even

a temp can use.



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# Why let the computer call the tune at work?

actually be done about the loss benefit either to the human race of skills for which Alternative or the individual worker for him Technologist Mike Cooley so to keep on doing them. eloquently mourns (see page

He would hardly advocate an embargo on the introduction of computer-aided design systems and other white-collar computer equipment, if only because economic growth and retention of international competitiveness are dependent on new techno-

conscious of a better way to ouild a mousetrap, hardly anyone would choose to return to the old way. An American typist recently, under the mistaken impression that her word pro-'steam" typewriter, exclaimed, 'No way am I going back to

washing my clothes on a rock!"
It is indeed sad that some design workers are losing the value of their skills and their prospects for what has seemed to them interesting work. However, this has always been an inevitable part of technological change, that some specialised workers are harmed while society as a whole benefits from increased production, and this continues to be the case.

The claim that creativity is being lost is doubtful. Outside the world of Artificial Intelligence few people would say hat computers are actually being creative at present, and the jobs that have been taken over by machines so far are definitely not creative.

They may be complex but they are still basically

THIS week we have a bang up-to-the-minute interrupt concer-

ning a system which "has implications so extensive and so profound that the term revolution is by no means an exaggera-This quote comes from an ad-

vertising letter I received last month promoting a Viewdata So persuasive was the broch-

ure, I could hardly resist it. From the likes of Rex Malik and Sam Fedida, no less, I will be able to acquire knowledge of the structure of viewdata (I thought it was now called Prestel), Post Office costs and how to design dialogues with the system. The letter was a masterpiece,

exuding expertise and PO awareness. The only trouble was that it did not have a stamp, and we had to pay the earth for the rivilege of receiving it. The moral is, of course, that he

who wants to communicate must first get his protocol right. This week's E5 Interrupt prize goes (in a stamped envelope) to Anthony Cobb of Malkins, Utkinton, Cheshire. Where the machine's product

is actually inferior to the human's, through enforced standardisation and the like, computerisation may be undesirable, but this is simply one of the factors that must be weighed when considering change.

Cooley's claim that people are being forced to pace their work In addition, once one is to the speed of the machine is of of the outstanding features of computers is their infinite flexibility, which enables systems to be designed around cessor was to be replaced by a exactly what the user needs, ready for action when required

cheaper and cheaper, and liveware getting steadily more expensive, this is the only sens-

ible way for things to work. If systems are being installed that force-pace humans, this is not a sinister case of machines taking over; it is simply bad management. People are happler and work better when able to choose their own speed and way of doing things, as experiments with work groups replacing car assembly lines

It is certainly the business of individual workers and their unions to press for the introduction of systems that have a "human face", and their most effective way of achieving this is

such systems are more effective. Certainly with the current shortage of both engineering and office staff, firms must be-

come aware that they will not be

able to fill jobs that are really "dehumanising". Indeed, on a broader front, it may be that many of the horrific prospects for total automation will not materialise, simply through firms' realisation of their own self-interest. The story goes that the boss of General Motors was showing a totally automated car assembly line to the head of the Auto Workers Jnion. "How will you organise these machines?" he asked

smugly.
"How will you sell them motor

RON Yearsley of BIS Applied Systems asked recently whether DPMs were going the way of the dinosaur (CW, October 19). Fortunately none of us will be around in 135 million years' time

According to Yearsley, fossils are not now limited to science museums — they are currently flourishing in DP installations. Unless the DP manager mends his ways, and accepts the users' demands for independence, the company's requirements for office automation and the industry's progressive developments, he will find himself stranded astride his mainframe.

The DP manager, Yearsley believes, was osmotically sucked up into computer should now become the progenitor of ideas outside the installation. Most DPMs, having consulted their Concise Oxford Dictionary first, would agree. They would be only too delighted to be given the opportunity of tendering corporate

Surprisingly enough, they are not unaware of the merits of word processing, the automated office and electronic mail sys-

DP management, the article suggested, should look further ahead than the end of the magnetic tape splice and step over the anti-static threshold into the great world outside. This advice was certainly in evidence at last month's Central London Branch

display (CW, October 26). The theme, "Is personal com-

puting relevant to the DP industry?", was one which is obviously troubling the DPM. In fact, Yearsley would have enoyed the occasion. DPMs were told in no uncertain manner that they were an irrelevance, standing in the way of the micro salesman and potential business users. Not many, it seems, love the DPM.
The first speaker, Paul O'Grady of Microfocus, did his

best to reassure a rather

apprehensive audience. Cobul he said, was now a feature of much micro equipment and existing DP programming teams would soon become dedicated to the delights of the floppy disc. Robin Woods, of the Isher-Woods sales organisation, suggested that the micro bug would broaden the minds of DP management, but not, presum-

ably, their budgets. He agreed that Cobol had opened up new opportunities for the micro-There is some doubt whether the ill-fated dinosaur was de signed in a practical mode. Not so the DPM. The first question: asked concerned system reliability. This concern, they were assured, was not a major micro factor. A complete

replacement system could be a egligible £3,000. Not only do micros apparently seldom break down, but many of the suppliers now have substantial financial backing. Even so,

and their servicing arrange ments are often far from ideal.

Conway Berners-Lee offered some small comfort to those present. He suggested that business problems come in all shapes and sizes and that the range of business opportunities being developed by the micro will generate ever increasing mainframe activity.

# Dol funds High technology creates jobs—IBM chief |

When so much depends on technology,

of specific important words is

particularly important in appli-cations such as banking, he says.

Weidner calls the machine the

Multi-Lingual Word Proces-

sing System," and is unveiling i

this week at the convention of

Association in New York.

the American Translators

competition and productivity, I believe that

is a productivity increase of 400 times."

OVER the past 25 years, high-technology perform them six to one, industries have created nearly nine times as many new jobs as low-technology industries, says IBM chairman Frank T. Cary.

Addressing the monthly American Chamber of Commerce lunch at the Hilton Hotel, London, last week, Cary underlined the contribution made by high-technology companies to the US economy by referring to "a recent study."

"In increasing output per employee, the high-technology industries outperform the low ones two to one," he said. "In producing real growth, they outperform them nearly three to one. And in holding down price increases — and thus inflation — they out-

languages by a human assisted

by a computer is the function of

a new system unveiled this week

by Weidner Communication

Systems of La Jolla, California.

Rather than trying to tackle the intructable problems of com-

plete machine translation, this

quipment works interactively

with human translators and is

claimed to increase their pro-

translation

TRANSLATION of foreign on a Diablo daisy-wheel printer.

mejor

netic tape.

its inhabitants."

Aid to language

As an example of the transla-

tion process, a Spanish sen-

tence such as this: "Pero

Odense es mejor conocido por el

would appear on the lower half

of the screen as: "But Odense is

through) the more famous (of

from) (his/her/yours/its/in-

habitants". The translator would

edit this to "But Odense is better

known for the most famous of

20-Megabyte discs. A four-

station system costs \$150,000,

considerably less than the

mainframes currently used for

translation. Further languages will be added later, being loaded

on to the machine from mag-

The system was developed by

The dictionary is held on two

known (by/for/

mas celebre de sus habitantes

microelectronic engineers, being developed at the Department of Education and Science A two to three year present of seminars intended reach 50,000 senior industrial ists, trades unionists, publics tor bodies and educational es blishments, is also planned by moves are being made under Department of Industry, Microprocessor Applicates Project, MAP (CW, July 13), MAP had an Initial budger C15 million, with £2 million, when the catted for education Map

micros

teaching

programm

A PROGRAMME to help scho

and colleges to understand

make use of microelectre, technology, and to developme

cated for education. More to £2 million has already been mised for education, inchi-11 million a year for three ye to the National Comput Centre to set up and co only. the series of seminars; and i consultants have already k.

Under MAP, £13 millar, allocated for support, grain up to 25% of projects repr the use of micros. There is been 94 applications for pre totalling £14 million. So far, 17 projects wie about £4 million have &

lead over the UK.

**Wilkes** 

ductivity by a factor of four. The system runs on a Digital Equipment PDP-11/34 with four DEC VDUs, and at present can approved, and awarded had of £1.25 million under MAP? only translate Spanish and English. The Spanish is typed on the keyboard, and the Spanish projects cover large and r. companies and range front words appear on the top half of controlled Homby a the screen. Simultaneously, a word-for-word literal transla. railways, to machine 🛍 The feeling in goes circles is that the USES tion appears on the bottom half of the screen, the translations coming from a disc-based dictioare clearly ahead in the nary. Using text editing functechnology, and that? and France may have

tions, the translator can then the Eyring Research Institute rearrange the order of the words in Provo, Utah, an off-shoot of and correct the choice of words Brigham Young University. where necessary. This is much According to Ted Crowther. quicker than writing out all the director of the institute's Com-Where a Spanish word could the machine's most useful be any one of several English words, all the possibilities are tency, in contrast to a team of displayed and the translator

simply deletes the unwanted ones. When he is satisfied with the final product, it is typed out Cramer UK sale likely

UK subsidiary of the big American electronic components distributor, Cramer, will probably be sold to the UK management within two to three months.

Managing director of Components and the UK management within two to three months. Managing director of Cramer

Electronics in the UK. Dave Griffin, says negotiations are nearing completion, though the financial terms have not yet The company is one of the

leading suppliers of microprocessors and related components in the UK, handling situation.

such semiconductor manufacturers as Motorola and Zilog. The move which, according to

Griffen, was initiated by the UK management, follows the sale by the US parent company of its Italian subsidiary to the local management there.

Though Cramer in the US is reported to have run into considerable financial and management trouble, Griffen points out that the offer to buy the UK operation is not related to that

## Gray back in profit UNDERLINING the business the quarter, where

computers, Cray Research has reported an operating profit of an incident of the same period of 1978. Which compares with a net ponding period last year. Turn-ponding period last year. Turn-compared with only \$533,000 in the same period of 1977. The reason for the dramatic turnround is that the company sold one Cray I computer during

ACOUSTIC COURT FRS

MOORE REED & CO. LTD.

make a sale in third quarter of 1977. Adding in a tax-loss benefit, net profit for the quarter was \$3.4 million. For the current period, Cray does not expect a comparable

improvement in performance over the last quarter of 1977. Blue Book back

## THE operating manual for the

Statistical Package for the Social Sciences on ICL 1900 computers, which is known as "The Blue Book" and has been out of print for some time, is to be re-issued a final time.

Anyone wishing the social state of the social science of the social state of the social science of the social state of the social state of the social state of the social state of the social science of the social science of the social state of the social science of the science of

De re-issued a final time.

Anyone wishing to order a copy should do so to: Lesla Matenozuk, University Computing Service, Leeds University LS2 917 before November 16. The price will be 212.70 or possible less it a size number of order is parties.

Department suit really is an anachronism."

Cary was in London for a joint meeting of boards of IBM Corp, IBM World Trade and

ALTHOUGH much of Frank Cary's address to the American Chamber of Commerce lunch was concerned with the distressing state of the US economy — nearly

all economists are predicting that 1979 will be a year of slow

growth or possibly recession in the US, and IBM's own econom-

ists forecast 2½% growth and 7½% Inflation — his view of the

future was optimistic, and he spiced his speech with humorous

Referring to the enormous

current account budget deficit being run by the US government, Cary noted that American bables cry louder than ever these days.

IBM is fortunate to be part of a hightechnology industry which is both highly "We are proud indeed of the contribution IBM is making to the UK economy," he said. competitive and highly productive.
"Computations which cost \$1.26 in 1952 "Since our last board meeting here in 1972, IBM UK has increased employment by more than 2,000 people to 14,600, and also tripled on an IBM computer cost only seven-tenths of one cent today. Adjusted for inflation that Referring to the nine-year-old anti-trust suit brought against IBM by the US Justice Department, Cary pointed out that not a capital investment. Last year we paid £53 million in British taxes, and purchased goods and services worth £71 million from more than 10,000 UK suppliers. single product manufactured by IBM today

"Last year IBM UK exports contributed was on the market when the suit was first more than £250,000 to the UK's balance of brought. "I think by every test the Justice trade," he added.



"They come into the world naked and hungry — and they are already #3,000 in debt."

inmos may set up centre in **Bristol** 

BRISTOL is one of several locations currently being evaluated by the National Enterprise Board's new semiconductor company, Inmos, for its UK technology centre. But contrary to recent press reports, it has not yet been selected as the site.

This was made clear last week by UK director, Iann Barron, who said that it would be another two months before a decision is reached. He did, however, list the qualities being sought by he company in its search for a suitable location.

On the parious state of the US dollar: "Even my daughter now demands her allowance in Deutschmarks," he said. "It must be a place where we can attract qualified staff," he said, "preferably a city, with good educational and cultural And referring to the growing realisation that government was spending much too large a pro-portion of the national income, he facilities, and inexpensive old of a senator visiting a college 'How can I get started in politics?" asked one student.
"You've already started,"
drawled the senator. "You're
already spending someone else's

housing."
A similar search is being made by the company in the US, for a site for the combined technology centre and US headquarters. Some American sources tip somewhere in Colorado as a

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—Jokes of Chairman Cary—

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## meeting of the IDPM, when many DPMs would agree that there was a record turnout for the mainframe manufacturers the Microcomputer Forum and Ten years ago... COMPUTER WEEKLY, OCTOBER 31, 1968

MÂURICE Allegre replaced Robert Galley as head of the French Plan Calcul. Galley had been made adjentific research minister... So far only one private computer programming. minister ... So far only one private computer programming school had applied to the Department of Education and Science for recognition as efficient, MPs were told ... Plans for a £35 million computer plant in the USSR were moving forward, with take between Soviet automation officials and Olivetti MD Bruno Yarak in Moscow . . A Japanese research group set up by Fujitsu, Hitschi and Kippon

Electric was working on the design of a system claimed to be more powerful than the 18 M 360/85 ... US exports of computers and related equipment were \$45.8 million in August of

New T-1612 160 c.p.s. bi-directional TALLY keyboard printer. Wide range of other From £193) Tally printers also available. LA36 DECwriter II LS120 DECwriter III ASR DECwriter II incorporating **同刊新刊版刊** paper-tape reader punch. From 2 100 Acoustic coupler. LA180 DECprinter I SYSTEMS LSI-11 Modules - ex stock PDP 11-03 with order processing of the processing purchase ledger, sales ledger round

TERMINALS: Newbury Labs' latest range of British VDI High speed, paper-tape reader punch.

Wilkes Computing Ltd.



# Marriage à la modem?

anaaarrrggghh! (They seem to the most funtastic, absurd nobe coming even more tions for your column and then frequently than that you discover that someone is nowadays.) Two sociology lecturers at the University of Utah have developed a marriage simulation system to en- claiming that he had "deterable people to choose a partner mined" what it is that makes rationally and logically."

They call it Matesim, and if I was being too ridiculous for this conjures up images of shoulated rolling pins and simulated mothers-in-law, I gather the system asks you doesn't it? Yes, you're right uestions about your "marital values and expectations, your singularly unsuccessful accorgeneral value system and pro- ding to all my observations. spective partner's values." It (We were talking about this at matches your answers with an installation where I used to those of prospective partners, work, when the chief proand tells you whether the marriage would be successful or

It even compares your nswers with "a set of idealised values that marriage counsel- as a flash, the unkind R&D lors have determined lead to a successful marriage."

The questions you are asked casters?") about yourself and your ideal partner concern physical tem is very flexible, to allow for nabits, characteristics, perso- the varying requirements of and habits, economic orienta- the user population. For tions, sexuality, personality characteristics, television viewing habits, job mobility, child discipline, "attitude toward life." and so on.

Reading about things like this is always very depressing

THIS IS THE AGENCY -SURELY YOURENOT STILL MAPPY IN THAT JOB YOU STARTED THIS MORNING?



marriage successful, you'd say

it all sounds strangely reminiscent of something. computer dating, which is for his social flair and irresistibility to women, chipped in with, "I tried computer dating when I was at college." Ouick manager replied, "What did you get - a 360/40 on

It's nice to see that the sysexample, staff at the Mormon Brigham Young University changed the questions about sexual values to ones on spiritual values, these being "more significant" to the

# Pre-paid

I'M SURE you will agree that pre-eminent position in the dvanced technology race is our aggressive, imaginative, no-expense-spared marketing. Take, for example, an adver tisement placed by Digico in the Financial Times. The firm offers to send you a FREE reprint of a computer magazine's appraisal of their so long as you send them o Perish the thought that they should spend 7p on a prospec

## THE IMPACT OF THE MICRO

tion technology has generated much hot air and many alarming warnings about the likelihood of the micro leading to massive unemployment, or has fed glowing hopes that it will be the dawn of an entrepreneur-led industrial Renaissance.

When the debate moves from theory to reality, it is clear that the trade union movement is going to play a major part in shaping Britain's

sphere has been lan Benson (right) national officer for Tass, the white collar section of the Amalgamated Union of Engineering Workers. Benson is a member of the Neddy computer sector working party, and proposed a motion at the Labour Party conference last month proposing more effective government planning to cope with the introduction of new technologies. In this interview with Computer Weekly aditor Malcolm Peltu, Benson discusses significant



# Key roles for training and public ownership

THE most significant result of relating to "the impact of the micro" is likely to be a major requirements so that there is no The c restructuring of some of Britain's educational and training institutions - and the bringing of more information technology industries under

That is the view of AUEW Tass national organiser lan minent in much of the "micro revolution" activity. While few who have examined the problem will question the need for new initiatives in training and education, the nationalisation of proposal which will face stiff

Benson ackowledges this in

long term shortfall of staff with the technical skills that will be

needed." he said. One of the most urgent actions needed, he believes, is the tral body with power to allocateresources to education and training where needed.

If the Labour government remains in power for another year or so, Benson believes there will be some major changes in the nature of the institutions responsible for education and information technology is a training. Under the Tories, however, he believes the changes will happen at a slower pace.

Political points such as these his references to the Labour are seldom far from Benson's government, which he hopes to view, because he sees politics as see re-elected, despite some being intimately bound with the

When workers are made redundant in a company because of the introduction of new computer-based technologies, more thought should be given to retraining them to take over the computer system development jobs currently undertaken by "subcon-

On what he refers to as "the He believes, for example, that politically neutral ground of there should be a "statutory training and education", Benson right to continuous 'training", said there had been "an enorand that there should be "colmous change of attitude" withlective agreements" to ensure in the government over the past that staff are provided with the

"For the first time, the minds of those with responsibility have assistance in that person's carbeen brought to bear on the problems." But on the question of increasing public ownership, Benson said he feared the Labour government had a "lack of political will."

The Labour manifesto for the next election is the place where Benson hopes to see a commitment to some of the points in the motion he proposed, and had unanimously accepted, at the Labour party conference last month, which called for more effective government planning logy and for more state inter-

Benson's strong left-wing opinion and some of the views he improvements in education has expressed on the Neddy were perhaps the most computer sector working party, significant recommendations of particularly relating to his desire to have more protection for the Advisory Council for Applied Research and Develop-British minicomputer industry and to try to make computer services companies more closely oriented to British manufacturers (CW, November 24, 1977), had made Benson something of

a bogey man in the industry. Yet his emphasis on the importance of training and public discussion on the micro education will be echoed by which has reached a peak over many of his sternest critics in the last few months could prove

something positive to ensure watch industry, and the nonthe current flurry of activity that there is a co-ordinated appearance of a national new-

course, the technology. But Benson also sees an important link between the technological debate and the central argument on the wider political establishment of some new cen-scene — the question of state intervention in industrial policy.

This, he said, goes beyond just the issue of the ownership of the means of technological production and into the question of how wealth generated by new techniques can be distributed to meet the needs of a society where some traditional beliefs and concepts of employment opportunities will be challenged.

'We have suffered from a hegemony of rule by economic pundits who have believed in the formula that technical change equalled increased production vhich would mean increased demand," he said.

But the potential that the of new technology. micro, computers and automation give to increase manufacturing productivity with significantly fewer people could change the focus of economic activity" so that "employment

He went on: "I believe that it is important to have public ownership of technology-based industry and for the state to channel resources to wealth. producing areas fuelled by the

"The state can then distribute the wealth to nourish the human factor, through education and the social services. After all, one of the main elements of wealth security" than just job security creation comes from the collec- und that a life-long national

increase in life-long education.

Legislation to ensure that the workforce is const

before new technology is implemented would not be of

much practical benefit, according to lan Benson

Employment minister Albert Booth said he was h

favour of such legislation (CW, October 12) but Benson

said that such a requirement was best enforced "M

collective action" and should not be left to the law

there will be less work is likely to create job insecurity."

Like many capitalists of whom he is so critical and also the former Tass member, Employment Minister Albert Booth, Benson would lay more stress on wealth creation rather

the efficiency of British industr

such as in Fleet Street who

down or halted the introduce

Benson replies to this and a

by suggesting that it is !! ..

to draw any overall confusivi

because the reaction of the

workforce to the introductions

technology "depends a lot of

puter aided design, computers can enhance a job and he be

lieves agreements on the intro

duction of new technology will

be reached, with an increasing

emphasis on "quality of life

rewards, such as lower working

hours and retraining, rather

than purely financial ones. He

believes that people will be

looking more for "careet

in other areas, such as com-

"In the future there will be an increasing proportion of the nopulation, including a growing number of retired people, who will not be involved in productive employment. If we are to avoid a total breakdown in living standards we must fed ways of growing the economy."

often criticised for being a block and there are many example union resistance has slowed

achieve a unified user voice, such as the National Computing Centre and part groups, have proved to be madequate. As Donald Moore, of management consultants Peat, Marwick

and Mitchell, who chaired the committee which undertook the study, says in his foreword, "The action that is recommended in the report covers a very wide field. To be effective it will need the encouragement of governments and some altruism on the part of the computer manufac-turers and professionals who occupy established positions."

some of the report's conclusions: Cost and performance: Most of the points raised by users relate to specific difficulties which they have experienced with past and current products of the computer hardware, soft-

ware and service industries, and which they would like to be remedied in future. While market forces can resolve many of the problems, it was felt that there are some product areas where it would be valuable if a mechanism could be established to examine, with users' help, what further action might be taken to ensure that their reasonable aspirations are not

market dominance. Users' need: There is a general sense of exasperation among users over the mystique surrounding computing equipment and practices.

frustrated by monopoly, or by

Hardware unable to operate in an ordinary office environment software imposing arbitrary limitations and heavy operating overheads, and program packages which perform less than users require, are examples of existing groups trying to numerous ways in which users

## 'Computers are used to silence creativity of people on shop floor'

FAR from saving us backbreaking work, computers will have the same destructive effect on creative intellectual work as machines had on skilled manual work in the first Industrial Revolution. This is the view of Mike Cooley, shop steward at Lucas Aerospace and a director of the Centre for Alternative Industrial and Technological Systems (CW.

Cooley, a mechanical engin-eer who is also past president of AUEW (Tass), was speaking on "Computers — an Aid or an impediment to Creativity" in the BCS lecture series, Computers and Society.

destruction of creativity, activity, rather "computers are the Trojan times. Horse by which Taylorism is going to be introduced into intellectual work." By Taylorism he means "Scientific Management" whose invent.

noley described computerised design systems in which humans are forced to keep pace with the rate at which the machine processes data, This way, Codley said, the human's creativity is

eroded and he is "reduced to feed are being conditioned to accept a role subordinate to the machine the selections." (lie machine, he said.

management scientist talking about ways in which human behaviour in production systems can be controlled, placing human material on the same footing as physical raw materials. "There are many disadvantages in the use of human operating units," this scientist said, "and any system using them must incorporate appropriate safeguards.'

Cooley expressed horror at this notion that human beings exist for the benefit of the machine — rather, he said, the machine should be designed for the benefit of the people. It is the computer that is becom-In addition to decrying the destruction of design Cooley put forward the view draughtsman, as in former'

theorised that each worker should be told exactly what to to make being disastrons to the overall scheme.

As an avanual of the control of th

# Users hit out on all sides in BCS three-year survey

SUCCESSFUL use of computers in the future will depend on improvements by manufacturers and users in the stability of systems, better implementa-tion of standards and improved training to increase the quantity and quality of computing pro-

That is the main conclusion of a survey of users conducted over the past three years by the BCS. involving the views of the 27 organisations representing a wide spectrum of users.

As reported (CW, April 6) the resultant report\* criticises\*the user-manufacturer interface as vell as indulging in an all-round flagellation of all sides of the computing world.

To an outsider, the report reads like an indictment of all things relating to computing dewell of the attempts of the BCS itself over the last 21 years to improve the professional image; of computing people.
But to anyone in the com-

puting world it contains little: that is new, although it provides a service by cataloguing some of the classic computing horrors and recommending some s difficult to see why these calls for action should succeed when similar ones in the past have

For example, on standards it makes the familiar calls for intensified activity by international standards bodies, with increased user participation and more vigorous government procurement action in insisting

Yet it suggests that all

to respond adequately and sensitively to their needs. Users are weary of phrenetic

ive and disruptive changes it has involved for them. Although they do not ask for development to cease, they do ask for action that will establish a period of and programmers. stability which will be characterised by longer economic lives for their systems, and by an evolutionary continuity in design which will protect their investments. A closely related requirement

The following is a summary of is for fewer standards, but more standardisation. This will give users a wider freedom of choice, and avoid their being locked-in to the suppliers of their installed

Users are also looking for some action to relax the restrictive and unfavourable terms of contract imposed on them by

Systems performance: Too many users have been disappointed and dissatisfied by the

users participate fully in innovation, and all the expens- drawing up system definitions cisely what requirements are to be met, and thus determine the work of the system designers

> Participation will not be possible for all users, especially the smaller ones, and some others will not wish to take part; it would, therefore, be valuable for Specialist staff: Users exprofessional bodies, such as the press considerable disenchant-BCS, to consider how best to bridge the communications gap between lay customers, the appropriate specialists and the crease both the quantity and suppliers and to make these quality of the systems views known.

Mini- and microcomputers: Users are concerned that the introduction of even smaller and creased by taking action to cheaper mini- and microcomputers will spread the direct use of free-standing and desk computers to a great many first-time large training facilities; improve users who have had little productivity; persuade other training and no experience in staff, managers and nonperformance of their computer system design, programming or computer specialists to train and

ensure that there is some recognised way of making computing professionals accountable for the systems they implement, were wo key issues raised by the BCS user survey. in many areas, such as dealing with government bodies on standardisation, manufacturers on contracts and, increasingly, with unions, general management are said to feel at a disadvantage as existing bodies do not represent the view of management. The report calls for an organisation to be set up to express the collective management view "forcafully, cogently and objectively,"

The report also concludes that the "total dependence of many

large organisations on their computer systems" raises urgent questions relating to the approval and security of the system and of the accountability of those involved in developing it. It calls for an initiative by interested bodies to determine what action is needed to protect the interests of users and society at large.

operation. The result could be transfer into computing, for widespread inefficiency, errors period. and reduplication of work

already done. puter specialists they employ. and consider it necessary to inanalysts, programmers and, to a lesser extent, the operators.

The quantity could be inimprove the pay and working conditions and career prospects of in-house specialist staff; en-

The quality could be improved by taking action to: increase the relevance and applicability of computer education and training to users' actual requirements; discourage job-hopping by requiring applicants to provide evidence of having worked on projects to their completion; encourage the acquisition of qualifications (MBCS, for example) by persuading employers to recognise these as necessary conditions for recruitment and promotion into the more specialist posts.

\*User Requirements in Data Processing will be published by the BCS on vember 29, £15 for non-members of the BCS, £10 for members.

# CASEMULIDROP V27 bis + ter Powerful network control facilities Already chosen by 2 European PTTs 2 wire dial-up NATIONAL CRASH STEELS ENGINEER IN CONTRACT FINAL FE oodcous Hill Estate Harehold Boar ckmanswerte. Herb WD3 321. Februari dephone Bickmapsworth 76698i field (

## LEASED LINES

What with the excitement of setting up the new offices in St. James's and buying a 3 magebyte 370 / 158 from an Italian bank, J.R. has gone red. Now he wants to set up a computer dial-up service so that ds and exchanges. I suggested ackboard and chalk and a kind of hurt took come over his face akin to that of a religious zealdt. I suppose we shall do it soon and will let you at

M.R.D. bought and sold some Model 5 IBM tape drives last Thursday and this is developing into a good line for us.

370/148s are a very good buy at the moment and we can offer a selection for you. The base price is 60% of IBM's new price. This means we can lease a 1 megabyte 148 to you for the astonishingly low price of £7,999 per month over four years. You can buy, lease or take a conditional sets—with or without Government capital ellowances. So, if you can't wait for the new "E" serios, give us a ring.

J.R has some 3420 Model 8 tape drives and 3330 disk drives for sale. M.R.D. wants to buy 3350 disk drives. Me7 Well I just want to sell that

Will write again next month.



tracted" systems houses, according to Ian Benson.

opportunity to undertake "lifelong" training that will be of

But he stressed that such courses must have "strong links to the country's industrial needs", and must be viewed as a co-ordinated plan, not an ad hoc

In order to achieve this, he believes the traditional education process is "slow and inadequate", but he is encouraged by moves such as the development by the Engineering Industry Training Board of more modular systems of qualifications, which move away from the idea of "time-serving

The need for training and ment working party on the the development of human impact of semiconductors (CW. September 21), which has been just one of the plethora of committee and task forces that have been established this year to

look at the impact of micros. Was Benson afraid that the to be a short-term media event

tive intelligence of the work- education and retraining force. It therefore makes both gramme could play an impo economic and social sense to role in making workers men raise the level of education, not open to the introduction of the technology, as well as interested the availability of those with the availability of those with skills to use and implement also that He recognises also that

"There must be an enormous transfer of wealth, co-ordinated by the state, into accelerating resources through the education and training system." He does not, however, agree with fellow trade unionists, such the ASTMS general secretary

Clive Jenkins, who say that information technology should be seen as an opportunity for moving towards a 'leisurely society" where it will be ex-pected that most people most of the time, will no longer be employed to do paid "work."

the recognises also that the recognises also that the changing nature of the isolar logy could create interest of the isolar friction and new kinds the old marcation disputed decline and "craft industries" of new substand the amalgamation of and the amalgamation of number of previous functions.

That is why, Benson said, The logical that any disputes could be that any disputes could with the union "to meet the collection need."

be continuous education geared in some way to the overall needs of the country, as well as individual career needs.

"The main aim of Neddy over the next year should be to influence the government and bodies like the Manpower Services Commission and the industrial training boards to do and that, after the reports from ACARD, Neddy, et al., all the activity would die down?

"No, I am not," Benson answered firmly. "This debate has struck a nerve in the social fabric and will not go away. It has made people more aware of the connection between apparently disparate events such as the decline of the old the time, will no longer be employed to do paid "work."

And whateve the pulling industry in the fitting in the time, will no longer be employed to do paid "work."

Californian Utopia but the proposers of that goal seem to have only a vague idea; of how we will get there.

"People do not want to be and hangement."

"The main aim of Neddy over the number of the industry in the work."

"It is all very well having an image of a kind of Southern Californian Utopia but the proposers of that goal seem to have only a vague idea; of how we will get there.

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The main aim of Neddy over the pulling in the med."

The main aim of Neddy over the pulling in the med."

Th

Management," whose inveninto the exact; form of parts, tor, Frederick Taylor (d. 1915).

theories of the Taylor (d. 1915).

theories of the Taylor (d. 1915).

"Computers are being used to silence the common sense and creativity of people on the shop floor," Choley asserted. He also claimed that over the centuries science and techno

logy have acquired "built-in logy have acquired "built-in male values," such as thrive, energy, and efficiency, and he would like to see more women in the field, to bring in so-called feminine values such as subjected with a single of the second of the se

I STILL see it in books and system, but they are somewhat articles: "Of course, wellwritten and detailed operator nstructions must be produced as part of the documentation

This is a traditional hangover from the days when computer hardware was expensive compared with today, and the rate of processing work was slower.

My belief and practice is that all operator instructions can and should be integrated into the program. The system itself should be capable of giving all necessary operator instructions in the appropriate situa-

It should also be programmed to undertake a maximum of the checks and analysis which the operator is asked to do today. It should also double check that the operator has actually correctly carried out any actions the machine has

To illustrate how far i would and do go, I'll mention the system where after the database backup tape is produced, the system requests that the file protection ring is removed.

The tape is remounted at machine request and the that much more than equally machine attempts to write on t. If it succeeds, then we know the operator has not removed the ring. Better to learn that now than in a recovery situa-

My operator procedures might well function within the They are portable with my

system, even when the operating system rug is pulled from under our feet. The controls are far deeper than the surface checks most operating systems perform, and the rejection of file mountings and program executions are more absolute and cannot easily be overridden by operators who are convinced they have the right file on anyway.

Frankly, any system which is designed to rely on a human operator or a generalised operating system is suicidal.

The principle of putting all: operator instructions into the program extends to microcomputers. Given reasonable secondary memory such as floppy discs and the fact that most microcomputers become totally inactive if people don't know what to do, or have done it incorrectly, the case for building in all manner of help and instruction into the microcomputer is great.

It is only slowed down by our laziness in actually designing and writing the programs, which should not really cost good written documentation and which could replace it.

I am at a loss to think of any modern system where it would be a preferred design choice to write down an operator instruction rather than to build it into the proframework of some operating grammed system.

Presumably there are exceptions, but I would much enjoy the Devil's Advocate position i any reader would care to state the case. Notice that we are not eliminating the operator from the loop, nor are we demeaning

We are simply automating the production of the relevant instructions at the right instant. We are making it unnecessary for the operator to read through a lot of material which is not relevant to the task at hand.

And we are putting the final responsibility for checking things where it belongs — with the system designer, the pro-grammer and the machine.

In some designs I make use of the question-mark facility This is even implemented i the hardware of some systems such as the HELP button on an IBM System 34, though little IBM software seems to be available to back it up yet.

Any class of terminal operator should be able to ask for help at any stage with the "?". He or she should get more detailed feedback than a simple hint, if the "?" is repeated.

in more advanced selfadapting systems, the use of the "?" should be logged in order to find system trouble spots. In some systems the user supervisors should be able to nsert appropriate instructions on an as needed basis.

Let us push the concept of automation one step further.

## THIS week's puzzle is submitted ments of n objects, a derangeby Gilbert Watts, of Sale, ment being a permutation where

Cheshire. He writes: A famous no object occupies its original combinational problem is the place, eg in how many ways can possible number of derange- a postman put n letters through = 5 then D = 44.

tion dinner in honour of a successful year, each man not only brought away the wrong hat and coat for himself, but also the wrong hat and coat for his wife. Moreover, the said pairs of hats and coats came from different

n boxes wrongly? The solution depends on a recurrence equation, and for n = 4 the number of derangements D = 9, and for n

The five directors of lphabeta Systems went one etter than this. After a celebra-

The problem is, how many lifferent ways is this double deManager created the Programgramming Staff. The Programming Staff was without form
the Project Manager and Proceeded to implement The System.

Chief Programming Staff was without form
the Project Manager and Proceeded to implement The System. ganisation," and there was Organisation. And the Project Users and said: "Let Specification. And the Chief Programmer it not. And th Manager separated the workers from the supervisors, and he

PROGRAMMER NOTES

isation and let it separate the

workers, one from another. And

the Project Manager created the

mission and he called it "The

System". And the Project

Manager separated those who

were to benefit from The System

from those who were to build it.

And he called the former

"Users" and he called the latter

A ND the Project Manager said: "Let all the Program-

mers in the Organisation be

gathered together into one place

and let a Chief Programmer be

brought up to lead them". And it

was so. And the Project

Manager saw that he was com-

A ND the Project Manager said unto the Chief Programmer: "Create for me a

schedule, so that I may look

upon the schedule and know the

tions be written." And there were meetings, and lunches, and telephone calls. And the called the supervisors "Manage-Specifications were written. And ment" and he called the workers there was a Payday and the Happy Hour, one month. ND the Project Manager said: "Let there be a mission in the midst of the Organ-ND the Chief Programmer A ND the Chief Programmer examined the Specifica-

(or what we in the business call a can throw a light on its origin.

heap of paper in the bottom drawer). indeed, significance,

the Project Manager

tions and saw that they were too ambitious. And he separated the mandatory features from the optional features: and he called the mandatory features "Requirements" and he called the optional features "Deferred" and the Users called him names. Lo, the Chief Programmer gave the Specifications to the Analysts and said: "Let the Requirements be analysed and let the Files be designated." And it was so. And the Chief Programmer sald: "Let the Software Houses put forth their salesmen and let us have a Data Management System." And it was so. The Software Houses brought forth all manner of salesmen who presented their packages, and daimed wonderous things for them, each according to his own

file structure. It came to pass

that a Data Management Sys-

tem was selected: and the Chief

Programmer saw that it was

good. And there was a Payday Due Date". And the Chief Proand the Happy Hour, a second grammer went among his stuff and consulted with them. And the staff was divided into two ND the Chief Programmer said: "Let the system be divided into parts, and let each parts, one part was called "Analysts" and the other part was called "Application Programmers". And the Analysts went part be called a Module. And let back to their desks and esprogramming teams be formed timated, as was their custom. It and let each be assigned to write came to pass that each Analyst a Module." And it was so, And brought his estimate to the Chief the Chief Programmer created Programmer, whereupon he the programming teams with collected them, summarised two levels, a greater and a lesser. them and drew a PERT chart. and he called the greater the "Senior Programmers" and he ND the Chief Programmer called the lesser the "Junior went unto the Project Programmers". And he gave the Manager and presented to him greater dominion over the the estimate saying: "It shall take 10 months." And the Pro-

lesser. And the Chief Programmer saw it was good. And the ject Manager was not pleased and said; "I have brought you up Junior Programmers saw it differently. And there was a Payday and a Happy Hour, a third A ND the Chief Programmer said: "Let the programming be started and let much rangement possible within five the Chief Programmer: "Behold, people? See page 53 for solution. see all that I have done! The Due overtime be consumed, for there one small change?"

from the depths of the staff: you have not grasped the Big Picture." And the Project Manager hired consultants, and authorised overtime and he spake to

SOFTWARE FILE

## This week's Programmer Notes was discovered, like the Dead Sea identified on the dusty screen Scrolls, by an intrepid explorer rum- have in our possession, but Powerful version maging through some dusty areas would like to hear from anyong The Gospel according to of IDMS launched

released in the UK in the middle

viously offered its own TP

monitor, is understood to have

implemented around 80% of the

program handling task in the DMBS itself. The remainder,

together with routines for map-

oing and screen handling, will be

implemented in IDMS-DC

A spokesman for Scicon, Cul-

linane's UK agent, noted that integrating TP monitor functions with the DBMS made pos-

sible a number of efficiencies.

such as a single log file for both

a walt dispatcher and resource

controller, he said, monitoring

all online database activities and

facilitating multi-threading. It

would not, he added, duplicate

the functions of existing TP

monitors already installed, such

as CICS or Shadow.
Enhancements in Release 4.5
of the IDMS/Culprit report

generator include greater

efficiency during multiple-report runs, greater use of the

Integrated Data Dictionary, and increased flexibility for database

A new facility is the ability to

generate data definitions

£½m profit

for BIS

TURNOVER exceeding £5 mil-

ion, with pre-tax profits of ever

The DC nucleus functioned as

Cullinane, which has not pre-

of next year.

system IDMS has been an- teleprocessing monitor due to be nounced by the Cullinane Cor-N the beginning the Project Date will be in five months." The are but two months let-N the beginning the Project Manager created the Programmer was much impressed and went from before ior and the Junior before in fraid, and they flowed the programmers, but two months left in and the Junior before in fraid, and they flowed the programmers. poration, together with a data communications product and major enhancements to its Culprit report generator.

The company has at the same time revealed that it is to take over Mentel Inc. a small Californian software products company. The acquisition is the first to be announced since Cullinane's highly successful launch on the US Stock Exchange earlier this year (Soft-

Standard," and there v. Standard. And the Progressionsked upon the Standard.

liked it not. And there a

Payday and a Happy No.

A ND the Chief Progre-said: "Let there be ha

≷eports, so we can monity

gress Reports. And the (

Programmer looked up:

Progress Reports and sr:

the Due Date was not tole:

And the Chief Progres

arose, pressed his suit.

his beard and went on:

Project Manager and gard And the Chief Progre

pointed his fingers, and a.

Blame to issue forthic

manner of creatures also

Hardware and Software

the Chief Programmers!

A was exceeding

and cast doubts now

Programmer's ances

tered a multitude of #

it cume to pass that o

sion was granted, and

Programmer took the East

back to the programming

and there was much reje

And the programming

Modules was completed there was a Payday as

Happy Hour, a fifth mout

that System Testing may be

HEN the Chief Progra

did go to the

Manager and said unto:

"Behold I bring you good!" of great joy which will car

all the Users, for on this

multitude of Users prise

Chief Programmer and a

"Glory be to the System".

System is completed denly there was with 2:

sixth month.

ND the Provide.

control," and there were!

ware File, August 17). Mentel's products, which Cullinane plans to integrate with IDMS, include systems for interactive text editing, word processing, and online program

Greatly enhanced efficiency in teleprocessing operation is the main feature of the new IDMS release, numbered 5.0. At field test sites, the enhanced software has achieved reductions of up to 80% in terminal response time, and 50% in elapsed execution time.

Much of this improvement can be attributed to the introduction of full multi-threading operation, the same innovation made by Cincom in its latest IBM-mainframe version of Total, release 8.0 (Software File,

Also contributing to faster execution is the provision of record level lockout. Protection against concurrent updates was previously implemented by locking at "area" level, which greatly increases the frequency

Other notable features of the new release are automatic recovery, warm restart, disc journaling, additional utilities, and an extended set of operator

Moves on European A ND the Chief Progation Said: "Let the Modus legrated, one with anoth agency for Omegamon And it was so. And it com pass that System Testing. A EUROPEAN agency is being negotiated by Candle Corporation, of California, whose main lockouts on the master system console, or lockouts caused by TCAM or Vtam: completed. And there se Payday and the Happy #57

product is Omegamon, a real time monitor for IBM's MVS when appointed, will also be responsible for marketing the firm's background performance

for use primarily by operators

mands, the user can format a display on the screen to investigate such areas an Contract and tech-

A major aspect of the system is automatic exception analysis.
Intended to warn the operator of operating system or hardware problems, this facility reports

THE Croydon-based by such conditions as disc dropped iteady, excessive swapping, ex-tessive address space waits, poping Jobs, and page data set

performance for off-line use by performance analysts. The primary outputs are summaries of wait times, which the package is said to relate directly to hard-

Epilog's principal use is thus and system programmers. It is used interactively through a dedicated 3270 or a TSO terminal time or low throughput. The system can also assist in the diagnosis of individual problems, such as a temporary in-

isplay on the screen to invessigate such areas as CPU and covice utilisation, TSO activity, paging and swapping, and SRM nounce the appointment of European marketing and technical representatives for its products by the end of the year. As a possible guide to prices. Omega-

Lowndes-Ajax Computer Service has acquired the System 2000 database management A further significant feature, and an explicit design aim is the like its liber in the liber in for Scicon

dictionary. Saving considerable coding time, record parameters can be generated from the IDD for both IDMS and non-IDMS simulating the operational characteristics of the helicopter. All the enhancements are The models will describe the mens implementations of IDMS.

users to be of a very high

## MoD contract ICL's 2900 Cobol may be adapted for 1900 series

Users still developing 1900-

commercial companies.

The Basic provided with

announced, Minimac could also

in principle be used on the 2950

helicopter development is to be provided by Scicon Consultency under a contract awarded by the Ministry of Defence. The firm is to build mathematical models

They do not apply to either the ICL or DEC versions, which are maintained by the companies

Manager for multi-user interactive Basic

restricted to the IBM and Sie-

at a large number of terminals is

supported by a new automatic

systems manager on the ICL

2903 range of small computers. Called Minimac, it has been de-

monstrated with 32 terminals

attached to a 2903, and was de-

veloped by ICL in collaboration

SUPPORT for the WG34

performance characteristics of navigation systems, sonobucy monitoring, tactical data handling and torpedo deployment patterns and overall system effectiveness.

MULTI-USER interactive Basic technic and Falkirk College of the engineering departments of

Minimac supports terminal

according to the version of 2903

Exec with which it is used.

with North Staffordshire Poly- also expected to be of interest to series Exec 3S operating system.

Technology (CW, June 1).

adapted by the company for its older 1900 series machines. type systems, whether for a 1900 or a 2900 under DME, would thus have the opportunity of

writing forward-compatible application programs and minimising future conversion A 1900 version of the C2 compiler, which is said by VMW/B

job entry and detaches jobs into Minimac is compiled rather than

from one to four batch streams interpreted. Although not yet

Although primarily aimed at the and the new 2956 under the

educational market, Minimac is DME/2 emulation of the 2903

ONE of ICL's "superstructure" standard, is reported to be under products for the 2900 range, the consideration by ICL as C2. C2 Cobol compiler, may be

COMPUTER WEEKLY, November 2, 1978

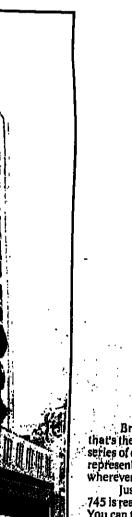
**EDITED BY PETER HEWITT** 

Such a development would not only ease the migration path to 2900, but would also, in the view of one user, make available an excellent piece of software to continuing users of the 1900

In contrast to its native mode operating systems for the 2900 series, which have attracted serious user criticism, many of the software superstructure products have been highly praised. Other language processors to have been specifically acclaimed include the Fortran FI and OFC compilers (CW, February 16).

## IBM release

AN online query system or iginally developed by IBM as project. System R, has been released by IBM in the US as an installed user program. The software, Query-by-Example, is said to run under VM/370



Today's\*

Branch office of the future, but available now that's the Model 745 Portable, from the "Silent 700" series of electronic data terminals. It gives wherever there's a telephone and power point.

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745 is ready to send or receive up-to-the-minute data. You can then make instant decisions based on reliable. accurate information.

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Portable Data Terminal. Tradematk of Texas Instruments

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Yesterday's branch office

£500,000, is expected by the BIS group for the year ending in February 1979. Last year, the group achieved £3.8 million turnover, with profits of £479,000. 

Epilog, a more recent intro-duction by Candle, provides hisoperating system. The agent, toric information on system monitor, Epilog.

Omegamon, installed at around 100 North American ware and software problems.

Epilog's principal use is the

nnemonic com- crease in TSO response time.

Once formalted the display on a dedicated terminal or in under TSO.

Dossible guide to prices, Omegamon is sold under perpetual licence for \$12,500 in the US, with a \$100 fee for a 30-day trial period, and free use during conversion to MVS. No prices have been announced by the

THE Croydon-based bureau

\* And we mean today's, The 745 is available immediately. Just fill in the coupon and send it now.

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Variations on

related cliches

## £1.3 million fund must go still higher

A FUND organised by a cancer patient to buy a CAT scanner for Manchester's Christie Hospital and Holt Radium Institute has

reached £1.3 million in 18 months. This amount would buy several scanners. However, the fund cannot a new building and of staffing and maintenance for the next 10 years, as vell as buying the actual machine.

"If you can tell me how inflation is former cancer patients or relatives of going to run over the next 10 years," said Mrs Par Seed, the fund organiser, "I'll tell you exactly how much machine to be bought is expected this week.

Austin Clarke, previously com-Cherril Garner has been appointed project leader with Genuni. Until puter development manager with recently she was a systems analyst with the Metropolitan Police. Leon manager of Yorkshire Post News-Opit, previously with Quadrant papers. Software, has joined Gemini as a programmer on DEC-based systems.

## Computers and the Nurse

N November 14, the Irish Com puter Society's Health Care Specialist Group will meet to hear a prosentation on Computers and the Nurse in a Hospital Environ-

The talk will be given by Clare Ashton who is sonior systems designer at Quoen Elizabeth Hos pital, Birmingham, at 6.00 pm and will be followed by an open

orum and refreshment The vonue is Trinity Medical chool, St James's Hospital, mes's Street, Dublin 8.

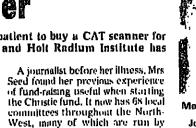
Andrew Jenkins, formerly senior development engineer with Memory Devices, has joined Burr-Brown International as a senior applications

Barbara Powell has joined Jenson Computer Systems to demonstrate and instruct in the use of the Word Eleven and other systems. Previously she worked in the Bertrain Group's bureau in Birmingham. Paul Wylle has joined Jenson as a traince programmer. He recently got his HND in business studies, data pro-



John Roberts, from the Welsh Deelonment Agency where he was a management accountant, has been appointed bureau manager of the Monmouth branch of Mills Associates. Edward Moore has joined Mills as manager of the North East London bureau. He was previously operations manager of

Dermot Eustace has been appointed marketing services manager of Gould Instruments Division. He was formerly advertisement manager with the journal Elec-



The decision on the make of

Peter Wright, director of inter-

national operations with Datatrol Inc.

has been appointed in addition

managing director of its new

European subsidiary Datatrol

Applied Devices Ltd. Datatrol Inc is itself a subsidiary of Applied Devices

Components, had joined Walmore

the newly-formed display division.

THE terminal sales and software

consultancy firm Grafton has

opened an office in Munich, Grafton

s owned by British and Swiss com-

Associate consultant at the branch will be Nicholas Lord, who

will be in charge of software con-

version projects. The address is Grafton mbH.

Filiale Muenchen, Postfach 820304.

0-8000 Munich 82, W. Germany

panies and operates in the EEC.

Telephone: (089) 4303093.

Grafton, Munich

Electronics to become manager of

John Mend, previously assistant ales manager in Sperry Gyroscope's ind systems marketing department. has been promoted to sales manager.

Barry Alken has joined Memorex as personnel manager. He was formerly personnel officer with British Titun Products, and before that was personnel manager, North, with

John Wentherhead, until recently customer services manager of Rapid tecull, has been made marketing lirector, a newly-created position.

area director of Sales and Marketing Services, with special responsibility for the London office of Sales and Marketing Recruiters. He was pre-viously South Thames branch nunager for Burroughs.

Barry Savery, group financial director of the Harland Group, has been appointed managing director of Harland Data Systems. Peter Skinner has become European sales manager and Roger Birkin, formerly R&D manager for Harlands of Hull, is now UK sales manager of Harland



Results:

Jadou O. SIA 5.

Lambeth O. Alkin . S

John Lewe, 5. Lambeth O.

were awarded 5-O victories

CSL 8, Computer Willy O

Computer Workly 9 (ICSL)

Targa O, Computer WHy 5

UCSUS Boozi DS 1

Farga O Bunzi DS 6

CDC 4. Hoskytis II.

Jadpu 8 T Alleri U

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Division III

JPC Victoria and Gill & Pullus

villation from the league and so the

Division III sides they did not play

Division IV

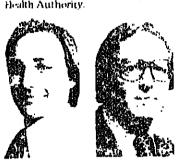
**Calls for papers** 

THE University of East Anglia's con-legence on combinatorial optimisation will be held at the University on July 9-12.

papers in a form suitable for public attor is April 2; they should be no more than 1,000

words long, and should be sent to Dr V. I. Rayward-Smith, School of Computing Studies, University of Lost Anglia, for with NR4 TTI, from whom further details.

Susan Grace and Bob Lindblom have been appointed branch support managers with Redifon Computers. Grace, who takes on the South-East branch, was formerly a senior sys-tems analyst with Redifon, and Lindblom, who takes the Southern branch, was a regional computer installation manager with the North-West Thames Regional



appointed European Industry marketing manager with Modeomp, was most recently marketing manager for manufacturing industries within Digital Equipment's industrial products group in the US.

## Ralph Smith, formerly sales inforex Midlands office



A MIDLANDS office has been opened by inforex, and will cover sales and service in Derbyshire, Herefordshire, Leicestershire, Northamptonshire, Nottinghamshire. staffordshire, Warwickshire, West

Midlands and Worcestershire. Joining the company to manage the v office as Midlands area manager. is David Winter, who previously held a similar position with Redifon Computers. Cron Ager, formerly a senior sulesman with Business Com-puters Ltd. joins the new inforex office in the same capacity.

telephone number is (04555) 56321.

Organising Committee, Atta. H. Meyer, c/o Containedon of the European Com-munities, BC — CBMN, B 2440-6141, Belgium, to whom 500-word summanes

hould be sent by December 30 A COMELRENCE and exhibition on en-Lutterworth, Leics, and the

Engsoft for September 4-6, 1979 fro date for the submission of sumairs December 1. Further details mayber from 10 ft. Adec, Engsoft, 6 Cart., Place, Southampton 502 0LG

Division II

Altergo

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Data olye

Larga Ronal D's

10 7 3 0 27 11 1/1 10 5 3 2 31 12 11 10 3 3 4 26 25 7

10 3 3 4 21 24

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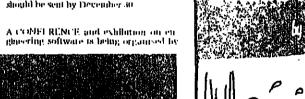
9 2 1 6 19 38

Computer Willy 10 6 2 3 36 22

Division III



PAPERS on real time data hardling and STRUCTURED progess control are solution for the first European symposium on the subject, to be field in West Berlin on October 23/25 (A) Cystems Analysh water Thereinher 13, and Effective (17) from A Royenther 13-17 me 5/27 1970 Among the sponsors are the Com-mission of the European Communities, the International Plectrotechnical Comcom es available from Hosey mission, and the Informational Organisa-tion for Standardisation. The prehomacy the title conce registrat. Vale programme, a list of possible reports, can be obtained from Real Time Data 79 -01/242/1951





# The case for the relational database

IN his article on System R (CW, October 19), Max Stewart claims that relational databases are "arguably the most significant development this decade," unfortunately without actually presenting any of the reasons for

Why is a relational database so significant? I believe the answer is because it provides direct end-user facilities; personal systems for people whose profession is not computing.

The fact that "personal computing" is usually associated with microprocessors only serves to emphasise the impersonal nature of mainframes. In proportion to their cost, mainfollow the standardisation of a frames have a very low level of usefulness.

The "personal" market is essential to computer bureaux and suppliers of turnkey minicomputer systems, but has been hadly neglected by mainframe such as portability, efficiency, manufacturers who sell primarexpensibility that are important ily to a DP department. Consein varying degrees for the task quently we should welcome for which it was designed. Users BM's relational database, since it would open the doors for other can ask for, and expect to get,

Even without IBM, there are numerous relational-style systems available on minicomputers and via time sharing services and I see no reason why these could not be enhanced to compete with IBM once a large - coming a larger investment than market has been established. PETER GRAVE ment to ensure protection for

Twickenham Middlesex

I HAVE noticed that in a series—tem is procured, the existing—bodies? The answer is simply by of editorial columns (CW, software should not have to be timely and informed comment. discarded, but transported to the new hardware. The (profitable) here, because the standards life of a piece of software may revision cycle of activity - i.e. well outlive several generations

August 25, 1977 to CW, May 11.

1978) you have emphasised that

the views of computer users

often go unheeded because

Let's look at the benefits that

programming language such as

represents a generally accepted

(much disputed - but accepted)

level of quality. By this we mean

that it has a host of properties

simplicity of use, reliability and

products (such as compilers)

Once such a language be-

that comply with the standard.

comes heavily used, the por-

tability aspect becomes import-

ant for the user because in-

creasingly users' software is be-

hardware and there is a require-

this investment — so that when,

Fortran.

The standard

Portran sought

users are not effectively organof hardware. ised. I would like to point to one It is doubtful if any manufacarea which overlaps the activturer can now introduce a new ities of groups such as manufacrange of equipment which is not turers' computer users associacompatible with regard to its a major new facility after the tions, where users and existing users' software without manufacturers, with the support running the risk of losing cus-tomers. This is part of the might have spent considerable of governments, are making progress in resolving some of evolutionary trend which foltheir differences, namely the DP lowed a succession of computer standards area. I would urge revolutions which terminated users to support these organisawith the introduction of the IBM 360 series of computers.

Because of obsolescence, currently Fortran is coming under increasing pressure from several more modern general-purpose languages and its long-term survival can only be ensured by an ability to compete effectively. As Fortran is not a generalpurpose language but primarily one used for scientific, engineering and statistical computations, it is not competing in quite the same area and can of the ANSI committee, a afford specialisations that a meeting with them will be held general-purpose language might

The ANSI Fortran Committee have decided that Fortran Treasury, PO Box I, Liverpool should be further revised fol- L69 2DQ. Users should speak up would happen if no code was lowing completion of the For- now - the next opportunity for written for this case. G would tran 77 language. This will en- major revision will not be until wander off through some able users to benefit from recent - after 1982. advances in hardware and software design.

How best then can users make eventually, a new computer sys- their voices heard by standards

The word "timely" is important specification, design, drafting, language implementation, user reaction - is basically sequential, and of a finite timescale. It is of little use having a proposal for drafting phase. This may seem

might have spent considerable

effort in formulating a proposal,

to have it rejected on grounds of

being ill-timed can only result in disappointment. Currently work is directed to the specification of all major facilities and revisions to be included in Fortran 82, and this stage will be concluded within the next year. After that, it will be too late to make further maior proposals and comment will be directed to ways of incorporating the chosen facilities into

To enable Fortran users to put their points of view to members on December 1. Details are available from J. Roberts-Jones, Data Processing Division, City

the language.

BCS Fortran S.G. deave well alone. This was done.

HAVING read Angus McQuibble's article on DP cliches (CW.) October 12) I was delighted to find a variation on my favourite cliche in the excellent letter from R. A. Rees (Letters, October 12), namely: "We can't have decisions taken by man or machine unless the process is fully understood by which the data output is reached".

a pair of

With regard to man, I often understand badly how I make decisions myself. It is clear to me (but I wonder how it is), that most other people understand their own decisions even worse (this is an aid to decision making), and I think it is even harder to understand how somebody else makes a decision.

With regard to computers, this relates to another favourite cliche: "Computers don't think for themselves, they just do what the programmets instruct them to do". Rather early in my career, I became involved in the design of an operating system (G) where the latter half of this cliche was clearly untrue. (I have been unable to find a sensible true meaning for the first

I remember being asked by a - programmer, what G should do in certain circumstances not mentioned in my enhancement design. Neither of us knew what routines, take a decision and act

on it, but what decision? P. A. CLARKE My advice was to test what G Chairman did and, if it seemed sensible, to

problems. So nobody ever knew how that case worked. Such de sign techniques are rarely described and hardly fit in with correctness proofs, but are, I believe, sometimes appropriate

May I also be permitted a few words to Ivor Catt on Computer Chess (Letters, October 12). He may well be right that a hardware breakthrough will lead to an Al breakthrough, but he underrates what can be done with current machines.

David Levy who beat the machines and won the bet is an International Master. The score was 3½-1½. I doubt whether Mr Catt could beat the best programs. Also computers are now very good at fast chess. It seems clear to me that a concerted effort by a good team of 10 to 20 people could produce a Grand Master standard program in three or four years.

The cost in man-years would be a small fraction of the total effort so far on chess-playing programs. It would, of course, be a microscopic fraction of the effort spend so far on playing

Munich.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. by the writer's name and ad dress, not necessarily for publi-cation. All letters are liable to be cut at the discretion of the Edi-

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# D. Harris. BCS 1976 Railway Hotel, Greenford, Middx. 19.30. Practical approach to installing computers for purchasing and supply, conference institute of Purchasing and Supply. Excelsior Hotel, Heathrow Airport, London. Introduction to microprocessors. C. Blake IEE Hatfield Section. Hatfield Association Whitehall Place, London SW1. 18.00 Data Dictionary Systems Working Party. Imperial College, London SW7. Register with BCS. Micros today. Juatin Forder. BCS N London branch. West Lodge Park Hotel, Cockfosters. 19.45. rwood Computer Centre.

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Applications of interoprocessors in telephone exchanges, colloquium. IEE, Savoy Place, London WC2, 14,00, Register with Secretary, ref. LS(DA). NOVEMBER 7-10 Planning and project resource es-timating techniques. Neil Probble. BCS E Anglia branch. Thomas Paine Hotel, Thetford, 19.00.

Pattern recognition, 4th international joint conference international Association for Pattern Recognition. Kyoto,

Experience in the use of computer terminals at the supermarket checkout. D. Harris. BCS NW London branch. Rajiway Hotel, Greenford, Middx. 19.30.

Teddington, Middx. 14.15. Book in advance, 0483 716161, ext 47.

Problems of the computer operator, forum. BCS Kingston-on-Thames branch.
Regional Management Centre, New Mai-

Holography, engineering applications . N Birkett, 19:FTE, Dept of Mechanical agineering, Loughborough University.

19.30.
Telecommunications. Dr. R. Rosner.
Polytechnic of Wales, BC'S Swales,
branch Polytechnic of Wales, Treforest.
14.15. Details (1943) 405133.
The role of the computer in river
management. D. Hilder. BCS N Staffs,
branch. Post House Hotel, Nawcastleunder-Lyme, 20.00.
Visit to JCB. BCS Wolverhampton
branch Uttoveter. Numbers limited contact G. Hainer, Wolverhampton 27371.
COTEN. the BSC network. I. Dewis,
BC'S Tesside branch. Teesside Polytechnic, Middlesbrough, 19.00.
Microprocessors in business. BCS
Humberside branch. Willerby Manor

NOVEMBER 8-9 US Federal computer conference and exposition. Federal Education Programs/

Computer architecture Prof Frank Sumner, IEE, Suvoy Place, London WC2, 17.00.

Fiture of computing Dave Firnheig, Association of Independent Computer Specialists, National Liberal Club, 1 Whitehall Place, London SWI, 18,00 Data distances and processing PCS

Visit to NPL. BCS Displays Group.

supersonic evening BCS Kingston-on-Thames branch. Regional Management Centre, New Malden. 19,45 Tickets £1,50, W. F. Welb, .14 Tuchwell Rd. London,

NOVEMBER 13

mberside branch. Willerby Manor

NOVEMBER 14 Real time operating systems and languages, lunclitime workshop. Digital Equipment. James Wall House, Totten.

am Court Road, London W1, 12.00.

Computers and privacy. Sir Norman Lindop, IEE Savoy Place, London WC2.

The Interaction between computer technology and society, colloquium Joint IEE/IERE Computer Group/IECS/IIEC. High simulation Mice Grant IECS across Place London WC2, 10,00.

The use of structured technologies in system design R. Robinson, BCS Rombranch, Computing Lab, University of Kent at Canterbury, IBA5.

Should computing Lab, Parkey Mark Wales branch, Res Should computers at the statement of the statement o

Should computerisation be stopped? lan Benson, BCS S Yorks branch/BIM. Royal Victoria Hotel, Sheffield, 18:30. NOVEMBER 9-10

International technical marketing con-ference. American Institute of Aeronautics and Astronautics/Technical Marketing Society of America, Brussels. NOVEMBER 9-11

interact 78, computer strategies, plan-ning for 1984, conference, BCS Belfast

NOVEMBER 10 EE. Savoy Place, London WC2, 10,30.
Standardisation of real time programming languages. IEE. Savoy Place, London WC2, 14,30.

An Introduction to API, Al Page, BCS.

An introduction to APL. Al Rose. BCS APL Group, Sheffield Bldg, Imperial College, London SW7, 10.00, Details Peter Cyriax, ICL Dataskii, 60734 583696.

Cyriax, ICL Daiaskil, 00734 583696.
interactive computing for research and development. Science Research Council/IEE. Rutherford Lab., Chilton, Didcot, Cxon. 10.30. Details from Mrs M. B. Sherwen, Bidg R20, Rutherford Lab., Computational processes as linguistic theories. Dr M. Steedman. Computation/Imaustics, University of Oxford. Dopt of Experimental Psychology, South Parks Road, Oxford. 17.00. Details: Mrs S. M. Hockey, 1el: 0865 50721.

Microprocessors. Dr. K. G. Pearson. Institution of Mechanical Engineers Applied Mechanics Group. IMechE, I Birdcage Walk, Lendon SWI, 17.30.

Daramation, Sheraton Park Hotel, Security, Dr. J. Horsey, BCS Craydon branch, Fabrileid Halls, Croydon, 19-15. Structured programming. Lin Sciongall, BCS Harlow Sub-branch, Harlow Lecture. Mike Grant BCS Rending branch Small Physics Lecture Theatre, University of

Career prospects in the computer for vice, industry, Alan Benjamin, BU5/5 Wales branch, Boar Hotel, Cowbridge,

Mezura 78 (testing, measurement, automation), interbiture 78 (office equip-ment and 191) exhibitions, and international seminar week. Management of national seminar week Management of the International Poznan Fait, Poznan, Poland, Details from IFG Industrie-Export Interessen GmbH, D-5658 Solingen/HRD, POD 100 419.

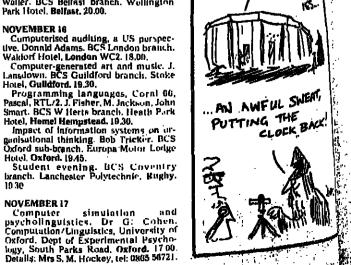
VIS-NEWS, IDPM, Visnews, Cumberland Avenue, London NW10, 18.00, Visit to American Express, BCS Sussex branch, Brighton, 19.30, How to produce an operating system, perhaps. M. Wright. Dept of Computer Studies. Herlot House, Sheffleid City

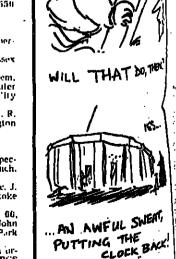
Polytechnic, 14.00.
Software for the small machine R. R. Waller, BCS Belfast branch, Wellington Park Hotel, Belfast, 20.00. NOVEMBER 16 Cumputerised auditing, a US purspec-tive. Donald Adams. BCS London branch.

Waktorf Hotel, London WC2, 18,00, Computer-generated art and music. J. Lansdown, BCS Guildford branch, Stoke Hotel, Guildford, 19,30. Programming languages, Cornl 60, Pascal, RTL/2, J. Fisher, M. Jackson, John Smart, BCS Wilerts branch, Heath Park

Impact of information systems on arguinstational thinking. Bob Tricker. BCS Oxford sub-branch. Europa Motor Lodge Hotel. Oxford. 1945.

Student evening. BCS Covenity branch. Lanchester Bullycachule. ixanch. Lanchester Polytechnic, Rughy. NOVEMBER 17





Computer simulation and psycholinguistics. Dr G: Cohen. Computation/Linguistics, University of

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**Edited by Martin Banks** 

Complete look at

THE complete works of the semiconductor industry in the production of integrated

circuits, is how the IC Master reference book could be described, covering as it does virtually every common type of circuit available. Unlike other reference books on the micro. the IC Master has the advantage of providing a

potential single source for information on all the components needed for the development of

semiconductors

# Dr Wilson prescribes more Euro comms investment

European action across a wide spectrum of policies relating to information technology, ICL managing director Dr Chris Wilson last week stressed the importance of the development of European communications services with adequate high bandwidth capabilities and the establishment of a secure European source of advanced silicon technology.

The development of the right communications infrastructure! is vital, he said, if the advantages of information technology are to be sufficiently exploited in Europe, However, he believes "previous efforts by European PTTs in this area have quite frankly left a great deal to be

He also said, "We must make sure that European sources of technology are available. Total or over-reliance on foreign sources for technology is only a short step from similar reliance on the finished product."

Speaking at a Press briefing to celebrate ICL's tenth anniversary, Dr Wilson concentrated on his vision of how "data processing and informatics" will affect the way society develops.

Central to this vision was the creation of a World "in which the integrated television display with its own processor and file storage becomes as much a part of the home as the telephone."

This type of device, he said, will provide the home of tomorrow with most of its communications with the outside world and highlights the importance to modern industrial

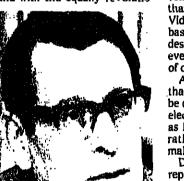
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capabilities, in particular the availability of high bandwidth systems, possibly using fibre optics for all telephone/ television users.

"Communications is a fundamental need of any society," he said. "This means that the communications revolution must go hand in hand with the processing revolution made possible by silicon technology; and with the equally revolutio-



"ICL is in a sound take-off gosition and can begin thinking and acting

nary changes in information storage technology currently

There were many complex implications resulting from the new integrated information services that are being developed. For society, Dr Wilson said

most important of all is the establishment of a truly effective body of European law governing those topics which are of legitimate public concern and which have a special relevance to the informatics community and those affected

"What we do not want to face is a mass of unco-ordinated national laws and regulations in this area. They would slow down the general progress of all of us through our legislators failing to understand the realities of the

vanced communications legal action include privacy and cally. the protection of the individual against infringement of personal liberty, fraud prevention, electronic funds transfer, transnational data flows and copy-

> rights and patent agreements. An indication of the commercial reality behind the kind of development envisaged by Dr Wilson was highlighted by a recent report from US consultants International Resource Deelopment Inc which predicted that the market for Integrated Video Terminals, of the homebased communications system described by Dr Wilson, would eventually amount to "billions

of dollars" (CW, October 12). And that report suggested hat the market for IVTs would be dominated by computers and ectronics manufacturers, such as IBM and Texas Instruments. rather than by traditional TV makers.

Dr Wilson did not refer to this report but he is obviously keenly aware that the challenges facing ICL over the next decade are likely to be very different from its first ten years, with the complex and unpredictable impact of technology (formation creating new market opportunties as well as new competitive

In the past, he admitted, circumstances had compelled CL "to take a very day-to-day approach to running our affairs. We have had to pull ourselves up by our bootstraps."

Now, however, he said that ICL was in a "sound take-off position and can begin thinking

PUTTING a retrospective boot

into the amalgemation of ICT and English Electric Computers to

aspect of that strategy even though Dr Wilson accepted there were many obstacles to overcome in trying to get Europe to act in an agreed, co-

ordinated way.

He stressed his belief in the establishment of a "minimum but necessary preference policy to combat foreign infiltration on an EEC basis," even though current EEC policy is moving towards more open competition in the community.

But Dr Wilson pointed out that, despite an EEC plan to remove preference in computer purchasing in 1981, there was no indication that countries such as Britain and France would be prepared to do so on a national ICL chairman Tom Hudson

closer than is often believed to current government thinking on preference policies. Dr Wilson's European hopes on telecommunications developments were also tinged with a strong awareness of some of practical problems of getting European authorities to act

said he believed the Tories are

quickly and in unison. He criticised previous efforts by European PTTs in providing adequate national communications infrastructures. "Urgent technical decisions

have been taken too late and in a account of what is going on and being achieved elsewhere in the world." he commented. In particular, he praised the

October 26) as being on the right But he accepted that to sunport an advanced communications network requires high bandwidth capabilities which

proposals of the US telecomms

giant, AT & T for its Advanced

Communications Service (CW,

Dr Wilson therefore hoped that the subject would "hit the whether society can also " headlines more often with the social consequences of an social benefits being made very - rapid developments.

must "involve major public in-

Addressing an audience of ournalists from UK national, local and technical papers, Dr. Wilson frequently stressed the role he believes the news media could play in creating a better and more informed understanding of the complex issues posed by information technology. The information processing

industry, he said, would provide increasingly efficient and effective technological capability but he challenged those in the Press, radio and TV to "generate the understanding, the discussion and the general will and desire manner which takes too little to benefit from what can be provided for the enrichment of aur lives."

While accepting that recent

Eventually he believed parer of automation devel; ments would accelet: dramatically but "" " mountime we have a break. space and must make the

own protest and file ster

impact of the micro had create

considerable public and police

interest and debate, the my

effect of the debate had been

create a "certain amount:

alarm and despondency" car-

to some extent by the emph.

in the programmes that t

micro has made possible t

automation overnight and the

But, Dr Wilson said, the

should be more considera-

in-depth judgments on the

mittedly spectacular ted:

Dr Wilson said he belie

himself that the alamabout

impact of the microism;

standable but does note:

geality. "I think that

automation develops

the slower than expected

of the numerous periple

geneering problems that

need to be solved."

logical advances.

most spectacular advance

there are serious doubtest

-'System 4 should have been killed'-

way to go - and that is forward." However, he added, "the payoff is becoming evident" for having been en industry leader in dealgning a new range "from the

ground up" and he predicted that other manufacturers, including IBM, will suffer "growing pains" in the future as they try to introduce new ranges. He also recalled that he had ated when he was asked to

Turning to politicians, he commented that people such as Harold Wilson, Tony Benn and

But many of the same politicians; he said, were also eager to disclaim responsibility for unpalatable events, such as fino.

duct, the 2K part.

Single board for \$279

logy 6502 microprocessor, 8K bytes of static RAM, a video display interface and a Kansas

City audio cassette interface. its one obvious disadvantage is that it is being sold without a power supply. However, the company states that any +5 volt

C. 3 amp supply will power it.

For the non-handyman, the

other major features of the characters, graphics and gaming board include an MOS Technology 6502 microprocess. screen resolution of up to 256

# Mystery over IBM RAM development

There is according to Rosen

a new MOS process, but that no

deals were made, and that

having proved that it can make

devices using the older metal

gate process with the 2K part.

has opted to force it up in device

The final clue comes in the

guesstimated" access time of

the 64K RAM. As the part is to

be used only in the slower 8130

system, rather than the faster

140, the industry speculation is

that the IBM part has an access

time of around 975 nanoseconds.

This, as Rosen points out, "is a

rather pale shadow of the 110 to

150 nanoseconds of merchant

As a final thought on IBM's position on RAMs, the old pro-

cess technology, and large chip

roductible. Rosen points out,

nowever, that IBM's history in

semiconductors has repeatedly

An equally small amount of

information is available from the

company on the new LSI logic

device being used in the System

bipolar device that is con-

structed as 704 TTL circuits on a

single chip. This tends to indi-cate that IBM has selected an

array circuit design technique,

such as has been used for several

years by Ferranti, with its un-

committed logic array devices.

This suggestion is borne out by the IBM statement that the

circuit designer specifies the in-

terconnections between the 704

circuits on the chip to meet par-

ticular system needs, this data

being used for subsequent mask

It is further borne out by a

comparison with Ferranti's latest ULA range, the 5000 Series.

Ferranti's device, at 484, has a

a greater number of different

What is known is that it is a

semiconductor

market parts".

current

38 processor.

THE introduction of System 38 by IBM, hard on the heels of the in the development of its own 100, has thrown another spanoriginal 4K RAM. This part, the 4096, has since been superseded ner in the works of guessing just what the company is doing in the development of high by a re-engineered part, the 4027, and is ending its final procapacity random access nories. To add to the 64K and duction runs about now. 18K devices introduced with the evidence to suggest that IBM 8100, the System 38 is to incorrecently went "shopping" to buy porate 32K devices, together

with a new bipolar, LSI logic array chip.
The problem with these devices is that IBM is unwilling as yet to issue any other information than that they exist. This is diametrically opposed to the normal behaviour of the semiconductor industry which tends towards a freedom of information that can, on occasions, even cause later corporate

industry observers, especially in the US, have however extensively analysed the little information that is available, and have come to the following con-

Firstly, the chip is very large. This is based on perhaps the firmest piece of evidence that exists, a photograph of the chip size should mean, in relation to (right) provided by IBM.

According to one observer, Ben Rosen of stock analysts, parts should be almost non-Morgan Stanley, in New York, relating the chip shown to the number of skin ridges on the fingers supporting it indicates demonstrated that the company that the chip is somewhere between 59,000 and 67,000 square memory products, despite such mils in area. This is around twice disadvantages. the size claimed by Texas Instruments for its own recently announced 64K part.

The photograph also provides evidence to suggest that, as a major US memory user put it, "IRM's design is primitive".

This is based on the ratio of storage area (the regular pattern down the sides of the chip) to peripheral and logic circultry. The normal ratio from the semiconductor industry is around 60:40, storage to peripherals. In the IBM part, this ratio seems to be reversed.

Coupling this with the little iformation provided by IBM as to the manufacturing process of the RAMs points, according to Rosen, to an attempt by IBM to use an obsolete manufacturing process.

The statements from IBM include "n-channel metal gate FET", "silicon nitride", and 'conductive field shield". The metal gate and nitride characteristics are features used for have to cope with a wider some time by IBM in the provariety of applications requiring duction of its major RAM procircuits. It also has 48 interface circuits, of which no mention is

These three point strongly towards an old, and now out of favour metal gate process. As an example of its obsolescence.

The nominal speed quoted by IBM is between 3 and 5 nanose-

33,000 square mils, while the Ferranti part is a little larger, at

The RAM guesting game . . .
IBM only provides this photograph as a clue to what it is doing in the development of high capacity random access

Bleasdale courses to cover T1 16-bit chips EXTENDING his horizons in microprocessors is course, will cost £235 and the latter, running for

microcomputer hardware, rather than just the microprocessors themselves. The importance of this lies in the fact that for every microprocessor used, there is a vast number of memory and peripheral circuits required. Divided into broad product categories, the

book then uses a major specification criterion as the key to finding specific products to suit a given requirement. For example, in memories, main key is the basic type - ROM.

PROM, RAM, etc., followed by device organisation  $-1.024 \times 1$ 

The cost of IC Master, which published by UTP of New York, will be £49.50 for the 1979 edition. A prepublication price of £39.50 is being offered until January 31, 1979. It is available

## Eddle Bleasdale, managing director Bleasdale two weeks, will cost £470. Computer Systems. Up to now a strongly So far, each course has been scheduled for six Motorola-oriented operation, his company is now runs during 1979, complementing Bleasdale's extending its range of courses to cover the Texas existing schedule of courses on the Motorola 6800 Instruments TMS9900, 16-bit device. Watts-Steadman and Two courses will initially be provided, covering Partners, Saffron. Walden, Esthe fundamentals of the device, and designing systems using the part. The former, a one week at 7 Church Path, Merton Park, London, SW19. More details can be obtained from the company

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form ICL, the ICL chairman Tom Hudson said last week that the merger should never have taken place — and onco it did, System 4 should have been killed. At the time of the merger, in 1968, he had advised the comgan to emerge more as an entity in

new company inherited commit-ments of shout £5 million to develop new operating systems for System 4 and that English Electric did not have a strong organisation backing up the range. In a remarkable speech at ICL's

tenth birthday "Press party", Hudson veered from his prepared speech to make his stinging attack on System 4, as well as peppering his remarks with some tart observations on ICL's early traumas and on politicians and former ICL managing director Geoffrey Cross. But his strong criticisms of

System 4 were the most surprising, as the internecine strife in vears of ICL, with mu the early years of ICL, with many English Electric staff ragarding the operation more as a takeover by ICT than a genuine merger, had largely been fogotten over the last few years when ICL because when ICL be-

the merger, said Hudson, had cost about £80 million in trying to iron out some of the problems of System 4 and in trying to integrate the organisations and product lines. "If I had been chairman at the time, I would have killed System 4."

Two major System 4 operations

Two major System 4 operating system developments in development at the time of the merger were Multijob and a system code named System R which was aborted by ICL before it became publicly available.

Commenting on his speech. commenting on his speech, some ICL employees said that Hudson falled to point out that many of the people working on System 4 operating systems have played a major part in the design

operating system for the 2900

Whatever else, the employees pointed out, the marger thurdore bequenthed ICL a pool of that rare rosource — skilled staff; and, as Fred Lamond recently pointed out (CW, October 19) there is an argument that ICL could have de better use of System 4.

Hudson also said the decision to go shead with the 2900 could be described as "almost foolhardy" because it was the kind of ambitious project which could so

"But once you get involved in a project like this there is only one

become company chairman in 1972 because he believed that the company had "deteriorated" since its inception and that it was then in a "precarious state."

Frank Cousins, were all now eager to claim that it was they who had been responsible for establishing ICL, seeing that ICL is now a financial success story.

Frequently emphasising own strong involvement and brought ICL through some cult experiences, Huddor !! prisingly commented that it wished former managing distriction of the balance of instrumental in bringing to the company in 1972, had left at 1972, had left at the company in 1972, Company a year before he dide Cross left last year for while

said were primarily persons i decided in 1972 (t. # necessary to bring in an empty of to help sharpen the company of the control of the con

added, the aggressive, prism added, the aggreent of a abrasive, management of a financial control was a substituted and levaluable and experience are industry and experience are clust appetitications.

duct specifications.

And he made it clear that he world he was a common opinion. Or Wilson world he will right man for the riest dead right man for the riest dead.

he Hudson also stated the state of the having been a ket fightly one of the milestone of the history, the acquisities of the international operations really business. Machines really half years see the state of th

THE price of personal computer hardware continues to fail, for the US company. Ohio Scientific, has introduced a single board system that includes an 8K Basic in ROM, and an integral "qwerty" keyboard for \$279.

Known as Superboard II. the case. This is being called the Challenger 1P, and has a price tag of \$349. For both versions, the company points out that export prices are slightly higher.

The video display capability provides upper and lower cas characters, graphics and gamin

×256 points. On a TV display, this can provide up to 30 × 30

Available options include an expander board that features 24K bytes of static RAM, a dual mini-floppy interface port adapter and the company's own 48 line expansion interface. A company is also packaging the board, with maker supply, in a complete software library is also available. Deliveries are scheduled to start in December.

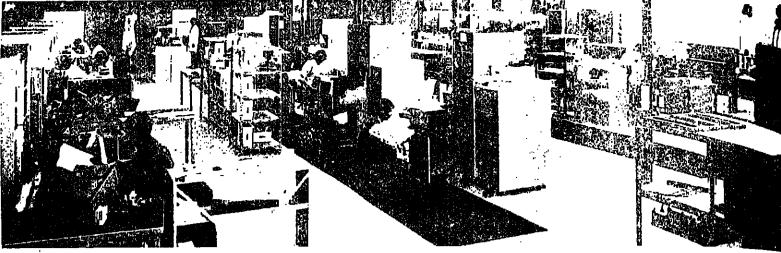




But computer companies do take maintenance extremely seriously, even if few can boast

quite as single-minded and enthusiastic as Pier-Carlo Falotti, head of maintenance for DEC in Europe. Tim Palmer reports from

This is the interior of DEC's European repair centre for faulty modules brought back from cusvice centre stores to be used aga as required.



maintenance fanatics Tim Palmer talks to DEC's European customer services boss Pier-Carlo Falotti

# Promising is one thing modules brought back from customer sites by service engineers. The centre, at Hoofddorp, Holland, brings ell returned modules up to the latest specification, after which they are returned to regional service they are returned to regional service.

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That is the uncompromising dictum over the desk of Piermanager of Digital Equipment's ustomer services organisation Falotti is passionately dedicated to improving service to DEC's customers throughout

Europe and the evidence sug-gests that this vital, but much neglected, aspect of the computer business is really getting better for DEC users.

Weekly a few months ago that IBM users were satisfied with BM customer engineering, and quoted a satisfaction figure of

"I was a little concerned at the report (CW, May 4), because our customer satisfaction rating — over a much larger sample than BM's - averages 7.4 out of 10 in some countries and, at worst, is

DEC has been conducting ustomer satisfaction serveys or ts maintenance operation for four years throughout Europe, and for six years in some coun-

the 10 same questions, and four years ago, the rating varied be-tween 5.8 and 6.2, so there has peen a consistent improvement. The questionnaire is sent out to our customers, and we get a 48 to 50% response, which

'We do a computer analysis of the replies and classify them by product and by type of customer. We are getting a particularly high rating from our 'critical' customers, those with appli-cations for which downtime is materially damaging.

"Such customers have a superior maintenance contract which guarantees a better response time and 24 hours a day service compared with the standard contract."

anything less than perfection.

"PROMISING is one thing — delivering is something else." each question, and are told that blem and our biggest challenge, zero means unacceptable, five and our rate of growth makes it

At the other end of the scale, fowest mark, 6.5, is given for preventative maintenance on

standard contracts, and this also rates low at 6.8 with critical 'You reported in Computer contracts. The lowest rating in the latter category is for repair time, which is rated 6.6 out of 10. Availability of spures is also rated low at 6.8 by both sets of customers, and looks like an area where it would be compa-

ratively straightforward to improve the rating next time. The other categories, each of which is rated 7 or better by both

"We have consistently asked

represents about 5,000 replies.

That sounds encouraging, but Faiotti is never satisfied with The rating should be the

same regardless of the type of maintenance contract, because

means average and 10 means The highest rating, 8.5 from

people in the UK, which is why those with critical contracts, 8.3 we have a service organisation from those with standard, is there which is more than twice given for "attitude of engineer"; the size of those of all other minicomputer manufacturers engineer, rated 7.5 for both types put together — including IBM's

'In France we recruit from a national training school for people wanting to go into elec-tronics, and in Germany from the Control Data Institute. We then teach them general computer science, trouble-shooting and "We recruit between one in 10

and one in 20 of the candidates we interview, and each is interviewed by at least two people. As a result, only IBM has a lower turnover of staff.

'We can still find trained

"In Italy we advertise, and offer a grant during training. We



Falotti . . . I will never be satisfied with anything less then 10 out of 10, but I know we can never achieve that: customers tend to be exigent when

sets of customers, are overall quality, which gets 7.2 on standard and 7.4 on critical contracts; response time; overall reliability; and field service

Falotti is convinced that far from being a fringe activity, quality of maintenance can make the difference between

those with the standard contract have lower expectations.

"I will never be satisfied with anything less than 10 out of 10, but I know we can never achieve that: customers tend to be exigent when they fill in questionnaires.

"On the other hand they tend to mark people-related questions higher than impersonal ones, because they don't like to say nasty things about the guy who comes to visit them."

This can be seen from a detailed breakdown of the figures.

Customers are asked to circle digits from zero to 10 against.

"Psopie are of course what a good maintenance service definition and basic trouble-shooting. "Over the next three months they are allocated according to aptitude, and spend half of each day doing a self-paced instruction course. So they do not have to spend three of four months sitting in class."

DEC's service business is organised as a world-wide profit centre. That way, we have the resources we need for investing the figures.

"Psopie are of course what a good maintenance service decligits from zero to 10 against." "Psopie are of course what a good maintenance service decligits from zero to 10 against." "Psopie are our integest, pros-

recruits per advertisement.

"We have specialised training schools, one for CPUs, another for mass storage devices and a third for systems.

"The students start with a spell in the office to get the feel of things, then do a month in

have a system rather than: hardware orientation. The emphasis has switched from its software to nearer 50% after all, if customers use DECnet, we have to have engineen who understand DECnet.

"This provides a clear carer path, because there are m specialisations which used a:

'We have a world-wide: gineering review board while assesses the capabilities of at individual, and people more to become systems and a tion engineers designiy." like networking system users; comparatively few t come managers.
"We do find a difference be

in different countries: people from the Mediterranean area tend to want to end up as the boss, whereas Americans do no. care so long as the money is good. But passing to a higher level via the review board offer a means of giving individuals enhanced status.

With a significant number ( tening and talking. Non-members of the BCS are multinational customers like welcome to our meetings -Chemical Bank, DEC mainte nance engineers are ofter everyone pays 50p at the door. It should be noted that membertravelling from country to country, which raises some man ship or affiliate status is, however, worth having: for example the cost of attendance at BCS 79 is reduced by more than the cost

"We have an internation? network of spare parts which is maintained according to the rate of consumption, and we used trunsfer the data on stock level and so forth by means of magnetic tape. But it is gettly harder and harder to transfe data across borders so we at going to have to find anoth way to do it." Similar proble urise when engineers try to take parts through customs.
"As long as parts can be

found, we will go on maintaining old machines. We have exert Massachusetts, which specially in making parts for obsolided in making parts for obsolided in making parts for obsolided in making parts including which we used to buy a since gone out of buy a "In Europe, we also have a central module remain facility in contral module remain facility in the light of the same is a second contral module remain facility in the light of the same is a second contral module remain facility in the light of the same is a second contral module remain facility in the light of the same is a second contral module remain facility in

Delaware Chancery Court to dismiss the case.

The subject of the suit and counter suit is Fairchild's 9440 16-bit microprocessor, which General, alleging an attempt to allege this is a violation of trade

# Package for architects

At BCS 79 the Microprocessor Since hardware costs continue Group will exhibit various wor- to fall, the proportion of value added to the package by software and innovation tends to rise. The argument against is that sooner or later we put ourselves out of business.

d'Agapeyeff, chairman of CAP; and Keith Chapple, managing director of Intel UK. It is expected to cover such topics as: should the UK concentrate on using micros, making them or developing software for them? You are invited to join our

This is the third in a short series about at Brunel University, outlines the part in the BCS 79 Living with Com-

the BCS Specialist Groups. John Race, activities of the Microprocessor puters conference and exhibition in

BCS group assesses the impact of the micro

a senior lecturer in computer science Specialist Group, which will be taking London from January 4 to 6.

be had from the BCS (01-637 When considering the impact microprocessors there seems to be three possible areas of discussion: The impact of micros on

meetings and information can

life in general, on the UK

king devices and there will be

discussion on the impact of

micro-electronics, led by Derek

Roberts, managing director of

Plessey Micro Systems; Alex

economic scene, and on the pro-In dealing with the first, a vigorous but emotional debate micros on the quality of life. We are fairly sure they will be as influential as steam, cheap elec-

ric motors, and transistors We can say, too, that the computer professional has perhaps more responsibility than most, and should act as a watchdog, giving warning when his devices look like turning antisocial.

This topic is splendid for debating, but at present involves more speculation than calcula

In respect of the UK economic scene, the issue seems to be. what priorities should be given to manufacturing micro-electronic components; developing software and systems using foreign components; using foreign software systems and components in our products and processes?

Arguments for the first are increased employment, decreased rellance on foreign street; nor have we yet imports, hence a better balance published anything. Instead, we try to educate ourselves by lisof payments and less chance of political blackmail, and a chance of commercial success. The arguments against are that we are late in the field, and that our market is smaller than that open

to the US manufacturers. The arguments in favour of the second point are that our costs are low and our skills are high in putting together pack-ages for other countries to use.

THE long-running litigation between Data General and Fairchild has taken a new twist, with the news that in the San Francisco Federal Court. Fairchild is counter-suing Data

microprocessors are, arguably,

the biggest things in computers

since the transistor. Their

effects on hardware and soft-

ware are already profound, and

may extend out of our own pro-

fession to change the jobs and lives of everybody.

The Microprocessor Specialist

November 1976, with the aim of

exchanging information on

nardware and software develop-

ments and applications in programmable micro-electronics;

software methodologies and

techniques; and assisting

members in dealing with sup-

oliers and distributors of micro-

We try to achieve these by

holding meetings, about five

times a year, at which an autho-

ritative speaker reports on his

company's or institution's activ-

Our policy has been not to try to devise or impose standards in

this field, or to take sides in the

debate on whether micro-

processors are a curse or a boon

to the computer professional,

the manager, and the man in the

ares and plans in the field.

romoting the use of relevant

prevent competition.
This follows a suit from Data General against Fairchild (CW, May 12, 1977) which has alleged misappropriation of trade secrets and violation of software licence agreements between the two companies.

Secrets, Fairchild, in its countersuit, allege that DG's suit, is:

an attempt to impede a natural and highly useful course of technological development and advancement.

two companies.

Earlier this year (CW, May 4)
Fairchild replied to the Data
General charges, and asked the

and advancement.

Fairchild has under development a new micro; the 9445, which, it is suggested, will emulate Data General's Nova 3.

A SMALL hardware and software package aimed at architects, engineers and surveyors has been introduced by the Royal Institute of British Architects with a view to easing the design task involved in buildings.

The package is based on a lator, coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle. The software is a coupled with a PC100B print cradle couple

Will this lead to bad program-

The argument for using foreign components is simply that we have got to improve our productivity and quality to emain competitive. The argument against this is simply that trying to remain competitive implies fewer jobs, which is unacceptable to the unions.

It is the impact of micro-electronics on the design engineer. the production controller, the accountant, and the DP manager or analyst that perhaps concerns the Microprocessor Group most directly. It seems very likely that micros are going to change their jobs radically This has arisen because Grosch's famous law ("You can get four times the CPU power

for twice the money") is no longer important. Everyone can have a calculator for petty cash, a computer for a few thousand.

ming, unsafe systems, and loss of central control as databases fly out of head office and roost in regional offices or even individual clerks' desks? Can the DP manager survive the loss of his blg mainframe,

and have even more influence

on his company by providing a

training, ideas, and software service for other people's hard-Our group is active in providing a platform for the ex-change of information on techniques for professionals of all kinds who believe they need to know about micros.

We think that we should not try to cover all the enormous issues raised, but concentrate on what they mean to the proCOMPUTER WEEKLY, November 2, 1978



A new line of calculators with plug-in function modules has been introduced by Monroe International, a division of Litton Industries. Celled the Monroe 2850 series, there are six models, ranging in capabilities from a simple printing version up to the 100-step programmable/printing machine which also has 48 registers that: retain data in memory even when disconnected from the mains power supply. Nine different function modules are available allowing the user to build up his own personal library of cape The picture shows the Monroe 2850 with its easily cha

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To: Computel Limited, Eastern Rd., Bracknell,	13-

## **Details of** additions to ICL 7500s

A TERMINAL programming language called TPL that meets requirements for data validation, error correction and local file look-up is a notable feature of the 7501 Model 15, one of two models added by ICL to its 7500 family of intelligent terminal

The other new model is the 7500 Model 10, which can have up to 40K bytes of memory, up to two video terminals and two printers. Software for data validation and screen formatting can be loaded from a remote host. The basic 7501 Model 10 with a 20K memory and one screen costs less than £4,000.

The bigger 7501 Model 15 has similar hardware to the Model 10 but with the addition of two dual floppy disc units, each with a capacity of half a million bytes. The floppy disc storage enables the Model 15 to be used in standalone mode, running programs written in TPL.

The 7501 Models 10 and 15 are both compatible with the more powerful existing 7502 terminal

## **COMPUTER WEEKLY, November 2, 1978** Sanction clouds over S. Africa

MANY South African computer supply companies are implementing measures designed to counter the threat of embargoes which may be imposed if the country fails to modify its internal policies to meet criteria laid down by the United Nations, writes Esmond Frank from Johannesburg.

Although most local computer houses are keeping their anti-embargo plans under tight wraps, the Pretoria-based company, Perseus Computing and Automation, which distributes Data General Nova and Eclipse hardware in South Africa, acknowledges that it has doubled the value of its stocks of components to stave off the effects of any possible sanctions.

Perseus managing director Doug Eyre said that the threat of a US embargo on

"To support the existing installed base of 450 Novas and Eclipses, by far the largest general-purpose small computer population in South Africa, we have doubled our component inventory value to more than R500,000 (about 225,000).

giving us an estimated two-year repair capacity."

Eyre added that Perseus has the capability of internally effecting more than 381 of all component-level equipment repairs.

But he pointed out that major benefits are still to be derived from access to the

But he pointed but that major beat well as to the fruits of the research and

development investments of leading foreign computer manufacturers.
"It is to be hoped that political

fuctors will not further jeopardise continued supplies from these sources. However, thereis should be marshalling their resources now to reduce the dependence of our computer in dustry on imports."

While he believes that it would be prudent "like the Boy Scouts to be prepared," he said did not make economic sense to actually produce indigenously while cost-effective imported products continued to be avail-

## Message switch from Arbat

A MESSAGE switching system has been introduced by Arbaid London, called Intelex. It tit. manage a database of 999 tele addresses with up to 99 names each, control 9 message priori levels and drive 48 telex lin and 48 terminals at the setime. Based on a PDP-11,#wa developed using Arbat's Ainsil operating system and progra-

where each item can be ordered by several customers tand can It optimises connection #: thus be ordered under a variety of order numbers) and where transmission activity by sieach order (and hence order-number) can be for several items. In ning its message queues la the example, Figure 1, Part 1, Spuman ordered kegs and taps in more than one message gong the order with an order number of 2. Bungs were ordered by Crudgington (order 4) and Fuddle (order 5).

> Dependency and keys. If the relationship between data items A and B is n-to-1 or 1-to-1, a particular value of A corresponds to

THIS week we will look in more detail into the meaning of

relationships between data items.

Item relationships: The term data item has its usual meaning: it

corresponds to a field in a conventional file. A data item value is a

particular value of a field. If changing the value of a data item has

an effect upon the value of another data item, the two items are

If two data items are related, there is a further measure of just

1-to-1 relationships: If any one value of data item A can corres-

pond to only one value of data item B and vice versa, the

where each customer has a unique customer number and no two

1-to-n and n-to-1 relationships: If any one value of data item A

can correspond to more than one value of data item B, but each

value of data item B can only correspond to one value of data item

A, the relationship between A and B is called 1-to-n and the

Salesman : Customer Customer : Salesman

n-to-n relationships: If any one value of data item A can

correspond to more than one value of data item B, and any one

value of data item B can correspond to more than one value of

data itemA, the relationship between A and B (and between B and

Customer

n to 1

order number

said to be related. Otherwise they are unrelated.

relationship between A and B is called 1-to-1.

Customer

relationship between B and A n-to-1.

1 to n

how they are related:

one and one only value of B. A value of A thus uniquely defines a value of B. A is said to be a key for B, and B is said to depend upon A. In the special case of a 1-to-1 relationship, B is also a key for A. and A also depends upon B.

Example: If the conventional file in Figure 1 were to be updated by an incoming transaction, the value of ITEM in the transaction record would be sufficient to select a single record in the file for update. DESCRIPTION or OTY-IN-STOCK could be immediately updated. The value of ITEM is insufficient, however, to update any fields in the repeating group (ORDER-NO. CUSTOMER, SALESMAN, QTY). Since, within any one ITEM record, the value of ORDER-NO is sufficient to identify any one member of the repeating group, the combination of ITEM value and ORDER-NO, value uniquely identifies a customer, a salesman and a quantity. The relationships can be summarised as follows:

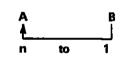
ITEM DESCRIPTION **ITEM** QTY-IN-STOCK ITEM, ORDER-NO CUSTOMER ITEM, ORDER-NO SALESMAN ITEM, ORDER NO

The combination of ITEM and ORDER-NO is thus a key for QTY, for example, and QTY depends upon the combined values of ITEM and ORDER-NO. Note that although ITEM. ORDER-NO is a key for CUSTOMER, having ITEM as part of the key is unnecessary since ORDER-NO alone is sufficient to define a

> ORDER NO ITEM

Any particular value of ITEM cannot be relied upon to select a unique value of ORDER-NO, or vice-versa. ITEM is thus not a key for ORDER-NO nor vice-versa.

Relationship diagrams. The relationships between the data items in Figure 1 can be expressed in the form of a relationship diagram. If the line joining two data items has an arrow at one end and not the other, the relationship between the arrowed end and the nonarrowed end is n-to-1. Example:



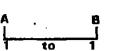
The relationship between A and B is n-to-1 and the relationship

By Max Stewart Part 2

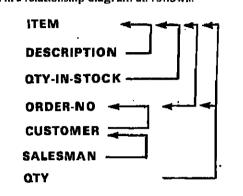
relationship between the two data items is n-to-n. Example:

If the line joining two data items has an arrow at each end, the

If the line joining two data items has no arrows, the relation-



The relationships between the data items in Figure 1 can be expressed in a relationship diagram as follows:

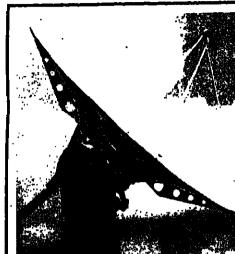


The notation

means that C depends upon a combination (concatenation) of A and B, and that the relationship between A and B is n-to-n. This notation is a special contraction of a more general notation which will be discussed later in this series.

In the diagram above, ITEM and ORDER-NO together form a concatenated key which uniquely identifies a particular value of QTY. This is significant: a key does not need to be a single data item, and the definitions "key" and "dependency" apply equally to concatenations of data items.

Summary: We have seen how the idea of a key and the notion of dependency are natural consequences of particular types of relationship between data items, and how relationships can be expressed in the form of a relationship diagram. Part 3 will demonstrate how a set of relational files can be constructed from a relationship diagram.



## Plessey radar helps monitor rainfall in North West

weather rader system to operate com-pletely unattended when it is set up on Hameldon Hill in Lancashire to measure sinfall for the North West Water Authority

nd the Met Office. and the Met Office.

Pleasey makes the radar equipment, called Type 45C, and the control is provided by a Digital Equipment PDP-11/34. The radar is reflected by rainstorms and the strength of the reflections enables the amount of rainfall over a page of roughly amount of rainfall over an area of roughly 100 miles radius to be calculated, replacing around 600 mechanical rain gauges. (A few

of these mechanical rain gauges are

A two-way microwave link will connect the unmanned site to the water authority's centre at Frankisw, where a dual PDP-11/34 will process the data, mainly for the purposes of flood warning in the initial stages. Later developments will enable the information to be used in water resource ellocation as well as weather forecasting.

the radar data to centres in Warrington, and the Royal Radar Establishment, Malvern.

ming language.

## Wave of enthusiasm grips software houses over IBM's minis 128K byte model of the new machine with so much more powerful that we have sent

IN the heyday of the pop music boom in impatiently over the telex machine as the mid-1960s people would rush out to details of the new System 38 chattered buy the latest Beatles or Rolling Stones through. "The first big surprise was the single on the day of release.

A similar wave of enthusiasm now iBM's small business systems whenever a disc, three screens and a 300 lpm printer it new model is imminent.

ware projects director at Osprey Com- screens and a matrix printer will bring it puter Services of Romsey found herself in up to about £1,700, and we are planning to the IBM regional sales office in Bristol on install a second one in the larger con-Tuesday afternoon last week, hovering figuration shortly. We were planning on a System 32 for a few months, but the 34 is System 38 application for a US customer.

price," she told Computer Weekly.

"We have one System 34 at present, ps software houses specialising in and with 64K-bytes, 13 Megabytes on rents for about £1,200 a month. Doubling Thus it was that Rona Bassett, soft- the memory and disc, adding two more

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and we expected to have to pay about "In fact, the 512K byte System 38 with 129 Megabytes on disc, 650 lpm printer,

six screens, diskette magazine and 120 chps printer will still only come to about £2,000 a month; we are taking all the software which will add another £300."

Osprey's first System 34 was installed in June. "We had intended to keep our

the 32 back," said Rona Bassett. "The other big surprise was the whole

relational database that you get with System 38. It means that you will have to design your system right but the approach that it demands is the one we use already in the systems we design."
Osprey specialises in IBM GSD

machines, and has written systems for 23 System 32 and five System 34 users. It has already received a contract to design a

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Data Control Taginical supp

By Morris Edwards

Ever since the development of electrical communication methods, work has gon on to improve the quality and the capacity of the transmission medium. The use of light to carry information has been exper mented with since the days of Alexander Graham Bell, but until the advent of the laser and the optical fibre this technique had not been practical. Now, communica tions systems based on fibre optics becoming a reality and in this article Morne Edwards discusses some of the latest de

refractive index differs slightly

for each wavelength, their pro-

passing down the fibre.

applications.

One way to prevent modal

differences so that only one

mode is allowed to propagate

along the fibre. Such single-

mode fibres have been tabri-

cated with bandwidths as high

as 2 GHz-km, but their small

core size creates difficulties in

into the fibre and makes align-

obtaining low attenuation.

THERE is nothing new about the idea of using light to carry vast amounts of information. In the nineteenth century, Alexander Graham Bell was for switching from copper wire keenly interested in the basic to optical fibre in view of the concept of optical communica- growing strategic importance of tions, and he experimented with what he called a "photophone". a system for carrying messages by means of sunlight reflected

However, two research breakthroughs were needed be- Corning Glass Works, Corning, fore optical communications could become practical. The first was the discovery of a suitable light source. Light from the sun or lamps cannot provide the concentrated narrow band of frequencies necessary for communications applications.

The answer came in 1960 with the first demonstration of the laser, a device which gives off a concentrated beam of light at a single frequency

The second major breakthrough was the discovery of how to make a suitable optical transmission medium. Transmission of light beams through the atmosphere is severely limited by fog, smog, rain and

However, specially made glass fibres can trap light waves and carry them for several miles with little loss in signal inten-

Today's fibres are so transparent that light loses more intensity passing through an orin 500 feet of fibre. Put another way, if seawater were as transparent, one could casily see to the bottom of the deepest ocean.

In terms of system components, optical links are no different from any other communications setup. You still have a transmitter, a transmission medium and a receiver.

be either a solid-state laser or a high-radiance light-emitting diode: the receiver uses a photodetector, which is generally a silicon avalanche photo-diode.

What makes optical transmission so radically different is the fact that it substitutes a stream of photons for a stream of electrons. This means that the optical circuit is totally isolated electrically, so it is immune to electromagnetic interference, does not generate inductive to the crosstalk of neighbouring copper circuits.

There is no need for extensive earthing loops or bulky cable shielding, and short circuits are harmless, even in an explosive

Further, since signals do not radiate from fibre cables, they cause the existing fibre attenuaresist intrusion. A simple, welldesigned cable would have to be broken into for an intruder to no longer regarded as a major gain access to the information. Also, the very weak dependence of optical loss on frequency and temperature simplifies the design of receiver electronics since

to other practical problems, such as increasing the informano equalisation is required. tion capacity, and developing Ootical fibres have the advantechniques that allow fibres to tage of being thinner and lighter tage of being thinner and lighter than copper wire, yet they have the tensile strength of steel. They lee have a for the strength of steel. the tensile strength of steel. They also have a far larger information transfer capacity Fibre attenuation has been

than copper wires. dropping steadily since A single fibre has already car-November, 1970 when Corning. ried more than 30,000 telephone reported two 30 metre sections messages over a distance of six of fibre optic waveguides with a

miles in a demonstration and the theoretical capacity of the fibre is on the order of 1,000 Mbps.

There is another good reason copper as a scarce raw material.

Despite these benefits of optical fibres, none of them warrants the effort required to develop fibre optic technology. in the view of Dr R. D. Maurer of New York. To him, cost has always been the dominant motivating factor.

Fibre costs have dropped dramatically to about \$1.25 per metre, but this figure is still high because of the laboratory environment in which fibres are

Assuming a normal operating plant production environment. Dr Maurer believes that present technology can reduce the cost to 10 to 20 cents per metre for

total attenuation of 20 dB/km. Subsequently, Corning reduced fibre losses to 8 dB/km, and in May, 1973, Bell Labs scientists announced glass fibres with losses as low as 5 dB/km. At this level, attenuation in the fibre accounts for 50% of light loss over a distance of 2,000 feet; this

urther apart than repeaters in the land cable systems then in Corning later reduced attenuation to 4 dB/km and in May, 1974. Bell Labs reported losses as low as 1.2 dB/km at the infra red wavelength of 1.06 micrometres, or microns. Now. Corning can produce kilometre lengths of

meant that repeaters in a fibre

optic system could be placed

To obtain such high transparency, optical fibres are designed so that the light never annual production volume in the comes near the outside surface

such fibres. The lowest attenua-

tions reported have been about

vided there are no sharp bends in the fibre, rays reflected back into the core at the first encounter with the interface will continue to be reflected along the length of the fibre.

Light rays that enter parallel to the central axis of the fibre will normally travel a shorter distance than those entering at an angle which carom from side to side as they travel down the fibre. As a result, a light pulse made up of a combination of rays becomes spread out over

This phenomenon, known as modal dispersion, limits the nulse rate, and thus the information capacity of the optical communications system. The dispersion can be greatly minimised, but not entirely ellminated, by grading or the core to compensate for the different distances that the rays

tremely difficult. Sources for antical comnunications systems may either be LEDs or lasers, both of which are comparable in size to the optic fibre, which makes for easier coupling. Both are also capable of being modulated at very high rates. Many modulation and coding techniques nary be used, but the binary on off modulation of the light source is the most practical. Analogue information, such as voice or video, must first be digitally encoded; it may then be transmit ted, along with data, as a stream of light pulses through the fibre to the receiver, where the photo-diode reconstitutes the original electrical signal.

source greatly impacts the emitted by the laser of its transmission performance.
Light losses in fibres arise from two distinct affine arise from two distinct affine arise from two distinct affine arise from the distinct affine arise from the distinct affine are two parts and the distinct affine are two parts are two part .wo distinct effects. One is absorption of light by impurities embedded in the fibre material. These losses can be reduced, but

Another source of loss is scattering of light inside the fibre (Rayleigh scattering). This loss decreases continuously as the wavelength increases and reaches a minimum at wavelengths between about I

operating at false with MHz using TTL tribuit and 50 MHz using ECL Dispersion also reaches minimum values at wavelengths in the vicinity of 1.2 microns, so to keep both attenuation and dispersion as low as possible, the wavelength should be in this

range.
LEDs made from gallium arsenide, GaAs, which emit at a wavelength of about 0.8 microns, are satisfactory. Howfinite packet of optical that semiconductor materials

are under investigation which wavelengths, and since the promise a better wavelengt match for optical fibres.

Until recently, the only prac-tical semiconductor laser for pagation velocities are different so the pulse spreads out while optical systems was the gallium arsenide laser, which emits a For sources with a large wavelengths between 0.8 and 0.5 wavelength spread, such as light-emitting diodes, chromatic microns. Research on new semicor dispersion can limit system

bandwidths and/or length. With ductor materials at Bell Lak however, has shown that addits solid-state lasers, which have a antimony to gallium arsenide very narrow spectral spread. un effective way to "lune" the chromatic dispersion is neglilaser. By increasing the amore of antimony in gallier arsenide antimonide, the ligh According to Dave King and Otto Szentesi of Bell Northern Research, modal dispersion in emission can be continuous step-index fibres limits the tuned to any wavelength her maximum bandwidths to about 0.9 to 1.2 microns.

35 MHz-km. Writing in the Already, such lasers ho February, 1977, issue of their operated for as long as 21 hour which is encouraging because firm's technical journal, Telesis, King and Szentesi report that GatAs lasers, which now have graded index fibres may have life expectancy of overtabandwidths greater than 500 - years, lasted only a few minus in their earlier laboratory w MHz-km, and they consider such fibres to be the leading In a report entitled "Fib candidates for communications

optic communications," lie national Resource Develor dispersion is to limit the core of New Canaan, Come. size and core-cladding index compares light sources & ding to the report, since. propagate many modes, # best suited for multi-

However, LEDs spreadily light over a wider angle that to ers, so loss output pixer can be coupled into the fibre The The small diameter, about two contput of LEDs, however, to four microns, also greatly more linear than lasers and complicates aiming a light beam | LEDs can be operated 69 timmously with little or no effect on their lifetime.

ment and splicing of fibres ex-Lasons can be operated to tutuously too, but the cost : presently high and the lithin generally limited to 4,000 hour at host with commercial last Nearly all of the comment LLDs used for fibre optic cer munications systems are based in the Burrus diode developed: Bell Labs by C. A. Burrus in 198

Lasers have two main advatages as light sources. Because the light emerges from the light in a narrow beam, it is possa! to couple a large fraction of a radiation directly into the sold an optical fibre. Secondly, 6 small spread in colour of laser light minimises chrone In the receiver photococcurs capture the photococcurs capture the photococcurs capture the photococcurs in

the authorised distributors at each location and generating as little paper as possible. electrons. There are two types photo-detactors found it. photo-detectors foundations resent day optical committee ply since photo-diodes; and simple avalanche photo-diodes for performance PIN silicon diodes have been committee programmed by the since they wavelengths between 13 it wavelengths between 13 it laser and LED sources with a laser and leaser and outine operations were to include order capture and invoicing, the central heating boller maintenance service, customer accounting, customer master records, purchase ledger, automatic predit control and comprehensive retrieval facilit was decided at the outset

that interlinked systems were unnecessary, but that an online link with Shell's own computer centre could eventually be de-The division did not have any ioneering instinct and man-

keting policies. datory criteria for the eventual While certain changes were choice of hardware were: known made in detail the approach has capability or implementation on remained the same in the system the part of the contractor, the which the heating and agriculuse of proven hardware and tural division is now mid-way in operating software and guaranteed maintenance and support.

THE heating and agricultural multi-functional interactive have visual display units and sentially complex, and had prereal time computer system is printers (Centronix 701). The one where all information distributor's staff input orders necessary to process transac- and produce priced delivery tions is stored within the computer and is available for interare accurately updated daily. rogation at all times to be used Automatic credit control preselectively and randomly to vents inadvertent deliveries to bad credit customers and engineers' calls are scheduled to make "All functions of the system optimum use of their time.

In 1977 Shell's heating and authorised distributor network. mented in 18 out of an eventual

agricultural division placed Following a detailed inves- 30-35 locations and has already

itself in the vanguard of deve- tigation in-house and a compre- met all its promised cost juslopments in the group by de hensive study done in conjunctification. This is the background

ciding to introduce distributed tion with the distributors, this to the distributed processing

a distributed net

processing techniques to its decision has now been imple- case study by Ruth Stein.

Oiling wheels of

process all transactions required

can be performed simult-

aneously through a number of

VDUs with information being

produced visually and/or in

printed form. Response by the

computer to any action initiated

through a keyboard linked to a

VDU must be less than five

seconds in all circumstances and

must average no more than two

was made, it alighted on a com-

pany which had already imple-

system in a fuels distribution

company and written special

applications software. Com-

puter Design Systems of

Manchester proposed a DEC-

based system operating under

Mumps, and a typical installa-

tion is now centred on a

96K-byte PDP 11/34 with 40

Megabytes mass storage, eight

to nine VDUs and four to five

Oils of Nottingham and Fuel

Services (Garstang), were in

1976/77, A 100% DEC solution

was soon found to be too ex-

pensive, although Shell would

have preferred a single

manufacturer, and experi-

ments were made using different

The choice of VDUs for the project was one of the most

significant. There would

ultimately be approximately 300

factor which made selection

particularly price sensitive, and

these would most immediately

users. This meant a simple, rug-

ged device without any complex

The success during the pilot installation of the ADDS Consul

520 from Terminal Display Sys-

tems was sufficient to ensure it a

One great advantage of the ADDS terminal was its accep-

tability to users. It appeared to

need little maintenance and its

fortable for people to operate. Its

UK supplier was a specialist in VDUs and was local to CDS.

the pilot scheme results were

the ability of the companies

positive view of their customers

and the strength which accrued to Shell in planning its mar-

The benefits highlighted by

represent the total system to the

peripherals and terminals.

Two pilot exercises, at Pilot

When the choice of supplier

to conduct business.

to three seconds

printers.

One application which is es- re-ordering of spare parts.

viously been handled manually with varying degrees of success, and administration. This in volved a 3,000 spare-part file and the new system now handles all charges for parts, engineers' calls, insurance and stock control. It is eventually hoped to

institute completely automatic

An extension to order capture is the ability to calculate how duled without the customer needing to order. Future applications will include the prediction of supply and demand among non-heating customers. Shell has found that users at

COMPUTER WEEKLY, November 2, 1978

ystems, Yvonns Bloor of Pilot Oils, Nottingham handles customs scounts and administration on the network. This is one of 300 terminals high are being installed by Shell throughout the UK.

Authorised distributors have had little difficulty in adapting the-job training.

to the system. Key personnel are trained one month in advance of the arrival of the system, usually four people per site, through an intensive one week course, and the division's own staff provides systems management skills.

A divisional implementation team also ensures that targets are met, supervises the data take-on period, and ensures on-

"Computer Weekly", "Data Processing" and "Systems International" present

Britain's major peripherals and systems exhibition Olympia, London, December 5, 6 and 7

10 am to 6 pm (closing at 4.30 pm on the last day)

Now in its eighth year, Compec is bigger peripherals, small business systems and than ever in its new venue and leatures mini and microcomputers. Here are a wide choice of computer some of the 200 exhibitors:

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egistration at the door costs E2, but free advan-gastration tickets will be sent if you leturn the application below to reach us not taler than OLYMPIA, LONDON

Data-Type Ten

Please send me free pre-registration tickels for Compac 78, which will save the having to pay 12 at the door.

Optical fibres comprise three layers: an outer coating to protect the glass fibre itself, which in turn has a core region with an index of refrection slightly higher than that of its surrounding cladding. In atep-index fibres (left), the refractive index changes abruptly at the core-cladding interface, Because light rays travel different path lengths in the fibre, the pulse spreads out — a phenomenon called modal dispersion. In graded-index fibres (centre), the refractive index of the core decreases parabolically towards the core-

fibres could have been used

years ago but the repeater

spacing would have been too

problem area and receives little

Instead, the focus has shifted

short for economic systems be-

tion was too high.

research attention.

range of 10,000 to 100,000 of the fibre, where dust. In such fibres, the refra

Dr Maurer states that optical Each fibre comprises three layers. The outer layer is a coating, usually of plastic, that provides protection from scratches and abrasion which Today, he says, attentuation is could weaken the fibre and lead

> Within the protective coating, the glass fibre itself has a core region with an index of refrac-

tive index, rays that enter the end of the fibre at a shallow angle to the central axis are reflected back into the core when they strike the interface between the core and the clud-

Rays that enter the fibre at, outical wavelengths.

surfaces would cause serious

to breakage under stress. tion slightly higher than that of its surrounding cladding. Because of this higher refrac-

large angles to the axis escape

scratches or contact with other index decreases with radial distance away from the centre. Since light travels faster in retion in refractive index so that

> Writing in the August, 1977, issue of Scientific American, W. A. Boyle, executive director of Bell Labs' research and communications sciences division reports that these "graded in-dex" fibres have reduced modal dispersion by a factor of 25 compared with "step-index"

fibres in field tests. Optical fibres also suffer from chromatic dispersion, which arises as a result of the slight differences in the refractive index of the glass for different

gions of lower refractive index. It is difficult to eliminate them it is possible to adjust the varia- completely. all rays arrive at their destination at close to the same time.

and 1.2 microns.

All sources of light contain a ever, Bell Labs' Boyle reports

MHz using ECL has phole 50 MHz using ECL has phole 51 licon; avalands phole diodes have the factor time, the beet signal health ratto, the highest have ufficiency and the high the attite sensitive walls to the high turient multiples with the voltages deeper to the high turient multiples at the sensitive walls to the high turient multiples at the sensitive walls to the high turient multiples.

installing.

By Ruth Stein

division handles all Shell's UK

oil sales to the domestic central

heating, agriculture, small in-

dustrial and commercial sectors

of the market. This is channelled

through approximately 45

authorised distributors, all sub-

stantial businesses in their own

right, who cover specific

franchise areas. A typical dis-

tributor, for example, handles

10,000 customers, employs 50

people and turns over

approximately £5 million per

annum. The division's associa-

tion with this network is close.

providing a number of service

Computerisation was first in-

troduced in 1978 when the div-

ision's routine data processing

bureau. This was designed as a

single entry sales ledger system

to control customers' accounts.

recorded on a batch basis and

sent by post to the bureau where

it was read optically and pro-cessed. Speedler than manual

operations, it suffered from the inherent inflexibilities of batch

in 1975 a look at Shell

Canada's newly installed minis

acted as the catalyst for a full-

scale reappraisal of the

division's computing techni-

ques. The bureau was anxious to

enhance the batch system in

order to eliminate sequential

processes and some distributors

were pressing for more sophisti-

cated handling, in particular

those companies with large cus-

The decision to implement a

fully integrated real time

minicomputer-based system was made after all other altern-

atives had been rejected. The

major factors which led to this

were the desire of the authorised

distributors for their own sys-

tems, the favourable economics

of distributed processing within

Shell's own marketing structure

and the marketing advantage such a system could provide in

the increasingly competitive

definition were to produce a

workable system controlled by

The objectives of the system

It required input data to be

nceds were handled by a leading

and support activities.

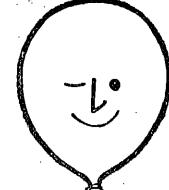
The division's users now ac-The company was specific knowledge the workability of about its requirements: "A the system. The altes involved

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# Why advanced technology Ings been quarantined from the rest of India

AT a time when the Greeter is at capital of \$5 million | \$4.5 million of which is at present paid up, held equally by Burrols From Trade Cope on security toucher it. 1976; as well as tember 16, 1976; as well as Tharnes, the operation of

pool of cheap and competent labour in the Bombay area. Everything manufactured or processed at SEEPZ is intended for export, and to this end, customs formalities are made very easy. Parts or work are airreighted in to nearby Santa delivered direct to SEEPZ, where they undergo customs

heoretically this provides for very fast turnround, and makes it worthwhile for companies to consider setting up, say, a data preparation centre in from the US or Europe.

clearance within the compound.

The most celebrated name at SEEPZ, Tata Burroughs, has not actually arrived yet, and when it does begin manufacturing operations has perversely decided to take space not in one of the factory units but in a large warehouse.

There is considerable confusion about exactly when Burroughs will begin manufacture at SEEPZ; some sny that printer sub-assemblies for the B80 small business computer will begin to be manufactured later this year; others say that neither dates nor products have been finalised.

Nevertheless the intention is certainly to manufacture peripherals and sub-assemblies for Burroughs low-end B80-B800-B1800 line, and the hope is that ultimately complete B80 systems will be built in India.

The company has an author-

munufacture and assembly, the company will set up a software

The principal work at industry is packaging semiconductor chips and stringing core memories. Wafers are flown in, scribed and diced at Indosit,

in India that sells time and offers

services to outside users, believes.

tself to be fully competent to colla-

As far as hardware goes, Bombay Surburban Electric Supply, BSES,

the city's power company, is better placed than most, with three IBM

1401s. The machines churn over for a

combined total of 1,100 hours a

month, over half the time being de-

voted to work for outside customers.

BSES is in the market for a new

1401s this year, and ICL is hoping to

BSES claims 50 computer pro-

fessionals with experience in

Autocoder, Cobol and Fortran, has

done conversions and markets soft-

ware packages, and seeks to colla-

borate abroad on the development of

Systech International of Bombay

is a small company specialising in the

use of computer-aided design and

systems analysis for the chemical

and petrochemical industry. It

employs 35 people including 10 con-

sultants, represents specialist soft-

ware company SDRC of Cincinnati

in India, and claims competence in

linear and mixed integer program-

The Central Machine Tool In-

application and system software.

get the business with a 2950.

borate on overseas projects.

Overseas collaboration

operate with foreign companies on the development of Computer-Aided

Design structural analysis packages

both for use in India and for export.

The Institute was funded by Czechoslovakia from 1961 to 1968,

and now gets funding of \$1 million from the United Nations Develop-

ment Program.
India EDP Centre of Delhi wants

to quadruple ,its number of

first in-house machine, an Interdata

employees to 80, and plans to get its

7/32 32-bit mini later this year. It is

developing a key-to-floppy disc sys-tem, and adapting a Linotype typ-

setting machine to take input from

Ost Data of Delhi specialises in

engineering applications, employs 15

professionals and says that it is col-

aborating on projects in France and

West Germany. It is also putting

together data conversion systems for

Isvaran Consultancy Services of Madras has five profesional staff and

is doing software development for a

microcomputer built around the Z80

chip. The machine is being built by

Processor Systems India of Banga-

lore, and includes video terminals.

two Megabyte floppy disc backing.

console typewriter, printer and tape

now so expensive that com-pantes are going back to the original macings and reproceswith the Indian government as a computer-based analysis tech-

Cobol compiler for usd on a 16K byte system which includes all the features of the Ansi standard apart from sort-merge facilities

Isvaran uses the 370/155 at Madras

Indian Institute of Technology for this

work, writing in PL/I and converting

either to assembler or machine code.

Thus the same compiler can be off-

Isvaran is planning to develop a

two or three partition operating sys-

taneous data entry, data processing

and spooling. It seeks overseus con-

tracts for the development of system

Getting right down to earth, Data Prep of Madras already has a con-

promises to start work on a job

tract from a US company for

punching and verifying mailing lists.
It employs 12 people, uses ICL keypunches, charges \$6 per 10,000 keystrokes punched and verified and

within two weeks of receiving the

tem for the 280, handling simul-

Plant: the system at present runs on an IBM 1401, but Isvaran will be

converting it to run on a Rjad ES-

sort-merge facilities.

# reports from Bandary on SEPZ, the Sents Cruz Electronics Eigent Processing Zone. THE Free Trade Zone less than the results in the results in

Work has already begin

partment is established covered base of information covered with or to be able to plan for all limit the impact of India. periodic droughts. The Finance Ministry is

The plan is utilmately task blish distributed databases various ministries byt 48 90 5 terim stop, all the databases be built up on the large co-puter, which will be accessed.

micro-computer terminals
The terminal computers to being made locally as about dozen have been built so it around Computer Automatic I.St. 2 microcomputers; some standard computers of ultimately be required, and it The company has developed a system to control expenditure on parts procurement at the Reduction

the database, using the lin Packard Image Dams of HP-21MX minicomputers

is expected to be used bath is expected to be used bath front-end to the maintain.

Oatabases are held by the black of the partments. The Agriculum partment is establishing the partment is establishing the partment of information controlled. surface and ground with

The Finance Ministry is the blishing a database of budgets information, including fortifications, including fortification, including fortification, including fortification, including fortification, including fortification, including fortification systems in additional licensing fortification in the systems in t systems handling lic manufacture, imports and

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Tymshare is the fastest growing time sharing bureau in the U.K., and is a subsidiary of a leading U.S. Bureau specialising in the solution of omplex financial problems. The company market a range of powerful financial application systems amound at giving senior management direct access to accurate up-to-the-minute information making the vital decision process a quicker and surer one.

Tymshare entered the market place in 1966 and have grown to a company of over 2,500 personnel, running approximately 60 maintrames with a turnover of \$150 million. The company have sales and service offices throughout America, the United Kingdom, Western Europe and Japan. They have developed advanced application software and a communication system TYMINET which ranks as the most proven network in the commercial computer services business.

Tymshare have been operating in the U.K. for a little over four years and have already achieved an enviable track record having the tastest growth of any Tymshare subsidiary. To continue this pattern severalserior inancial marketing personnel are required to augment a busy team operating in Central London.

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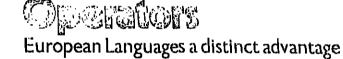
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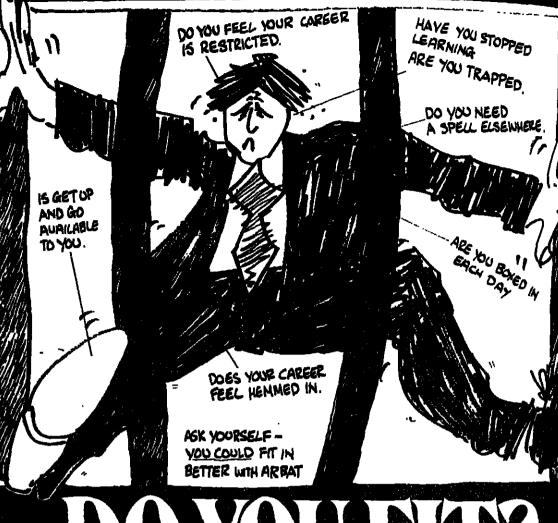
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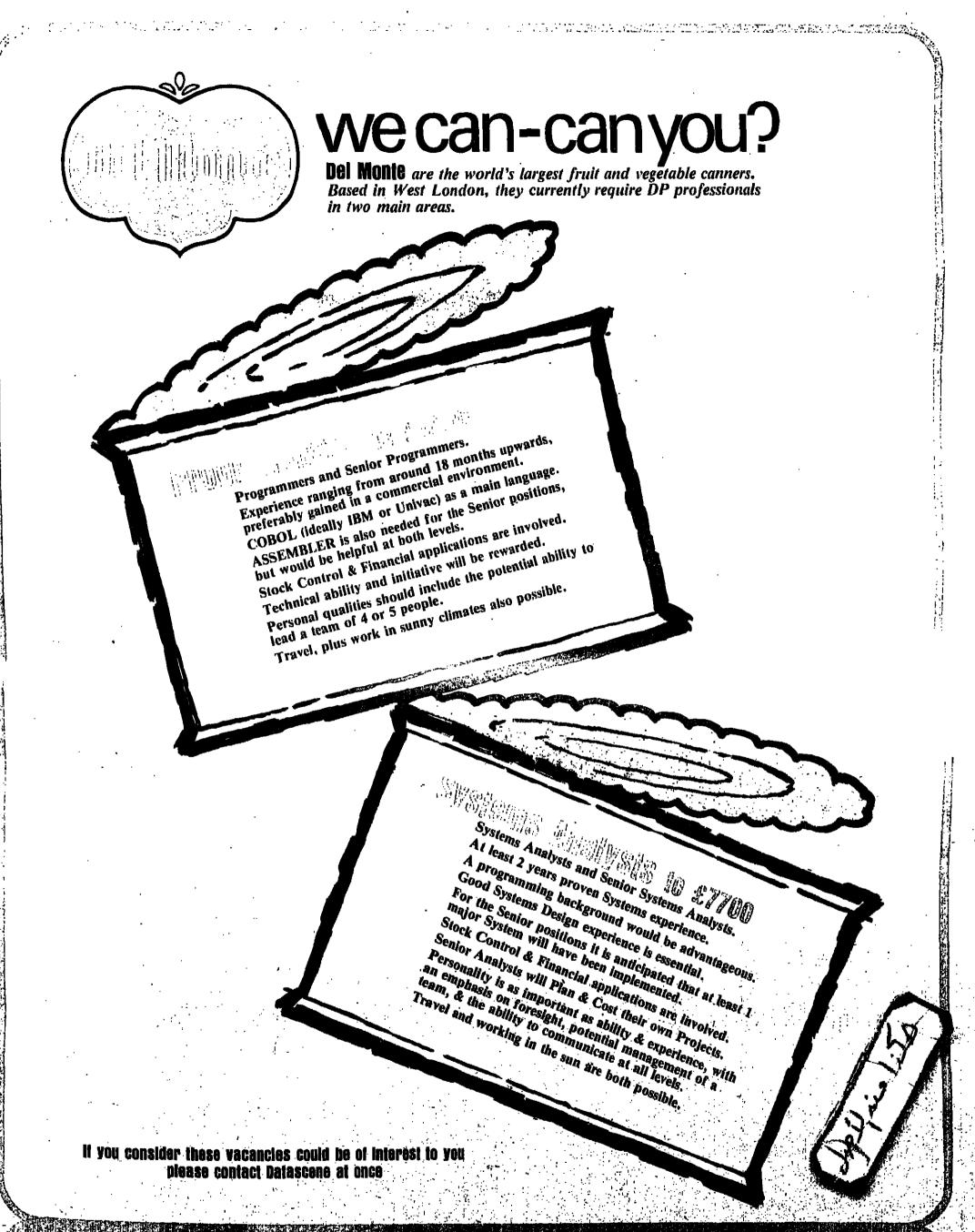
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Applicants wishing to discuss this appointment should telephone KEITH DUNCAN during office hours at the number shown below or between 7 and 10 p.m. any evening and weekend at Crowborough (08926) 5545, quoting ref. CW59.

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COMPUTER WEEKLY, November 2, 1978

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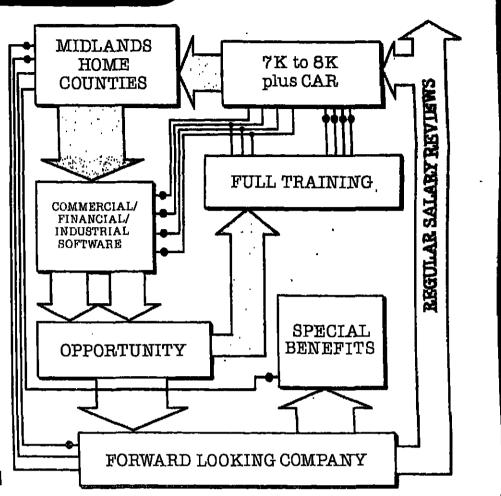
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Experience in computer scheduling developments and applica-

Experience in computer scheduling developments and applica-tions is highly desirable together with an appreciation of the workings of management information systems and the import-ance, role and basis of route costing.

Application forms are available from the Personnel Manager.
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## Senior Controllers

Ref. C/8/8763 to £5130 inc. S/A

With suitable experience of Data Control in a large machine environment; preferably including On-line Operating. Duties will include: being responsible for controlling all input data associated with processing, assembling and debatching data in accordance with pre-determined schedules, halsing with users, training all staff under him/her and being fully conversant with On-line Operations.

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## Commercial Analyst

We have a vacancy in our head office in Cardiff for an xperienced Commercial Analyst to assist in the develop of systems on a new mini computer which has yet to be selected and to essist with the implementation of Russ Charrington's group systems.

Applicants should be educated to degree level and should have at least 5 years data processing experience, preferably in a financial environment. A practical knowledge of management information systems is essential.

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We offer a competitive sulary, Company car, contributor Pension and Life Assurance Scheme, plus other benefits issociated with a major company.

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The Information and Computing Sciences Division of Shell Research Limited, Sittingbourne plays an increasingly important role in support of the search for new agricultural chemicals. To fulfil that role, the Division is looking for a Computer Operator to join a small group operating the Company's Univac 9300 and DEC PDP -11/40 computers on a shift basis. In addition the opportunity exists for programming for which you will receive training. Preferably you should have some experience with computers but if you have a mathematical/statistical bent', can show initiative, and work with a minimum of supervision we are willing to consider you. It is anticipated that current studies into computing on site will result in substantial new computing capacity.

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Mrs. M. J. Hunt, Personnel Division, Shell Research Limited, Sittinghourne Research Centre (c6), Sittinghourne, Kent ME9 8AG. Telephone: Sittingbourne 24444, extension 203.



# Move into D.P. Training

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Please write with brief personal and career details to Miss D. Archer, Personnel Officer, 3M United Kingdom Limited, 3M House, P.O. Box 1, Bracknell, Berkshire RG12 1JU.

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Starting salaries may be above the minimum, Non-contributory pension schome. The staff of Council are not Civil Servants but their pay and conditions of service are similar to those of scientists in the Civil Service.

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NATURAL ENVIRONMENT RESEARCH COUNCIL

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CHIEF SYSTEMS/PROGRAMMER Grade P.O.2 £6060-£6702 p.a. including

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Appliannts must possess a sound knowledge of ICL 1900 series software, a demonstrable management ability and sound experience in systems design and programming techniques and methods. Knowledge of TP processing requirements and myte recently, svalibble ICL equipment than the 1900 series would be a distinct advantage. Post Reference, 1522 / CW.

The post is permanent, superannushte and subject to the enti-factory completion of a medical questionnaire. Commencing salary will reflect experience and qualifications. Playes write or talephone 081/793 3185 for an application form questing past reference number to the Resonnet Menager. Satisfact Civic Centre, Swinton M27, 25N, to whom they should be resulted by 17th November, 1978.

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An experienced programmer is required with a knowledge of Systems Software implementation and applications program levelopment. Proferences may be given to candidates with prience of ICL or CTL computers.

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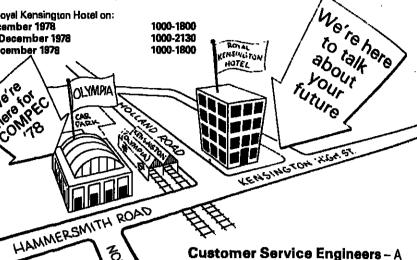
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Please write a brief ONE PAGE list of name, address, age, home and office telephone number, programs written to date machines and software involved, present position and salary, and send it immediately to ANTHONY SPURR, Management Recruitment Division, quoting G671, at the address below. Please list on the reverse side those companies you would not wish to be considered for. These appointments are open to either sex.

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BIS Applied Systems

salisty the growing requirement for TP application, the 1906S will be replaced by a 2960 early in 1980 Proposed applications include Materials Control/Purchasing Costing and Budgeting, Work Control and Scheduling, Plant Performance analysis and other engineering and commercial systems.

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HARROGATE

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Implementing, Designing and installing Computing Systems
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The person appointed will, in addition to the recruitment, training and supervision of the section's stall, be directly involved in development work as a leader of major projects and in the formulation of computer Branch Plans.

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Apprications should be on standard application forms obtainable by telephoning Recruitment Section (Harrogate 702633/4) and should be returned to the Rogional Personnel Manager, C.E.G.B., Beckwith Knowle. Olloy Road, Harrogate, HG3 1PS, to arrive not later than Monday 13 Movember 1878

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Central Electricity Generating Board - North Eastern Region

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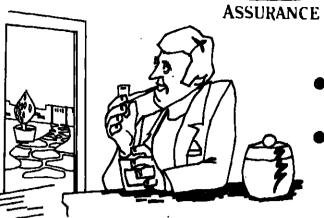
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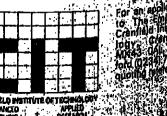
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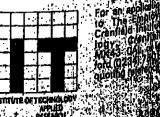
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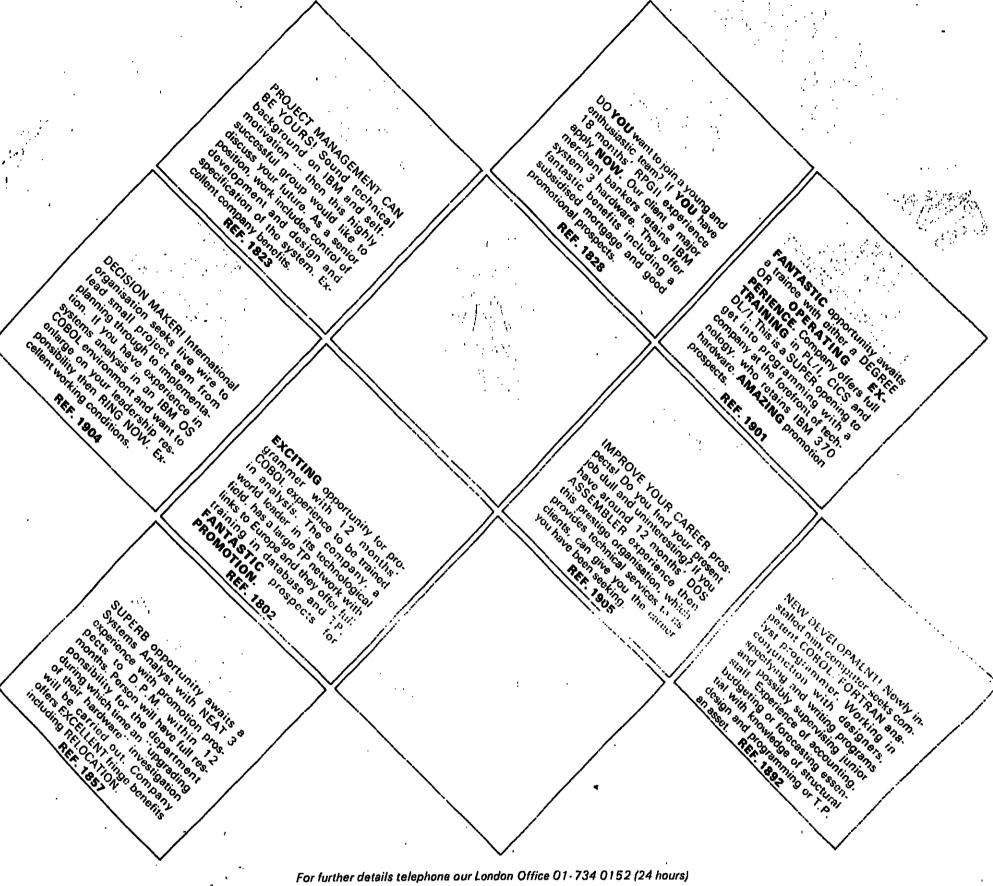
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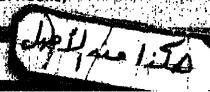
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Application forms and 1/2, particulars from the Regians, University, Keele, Stath 57 5 BG Closing date 1: November, 1978

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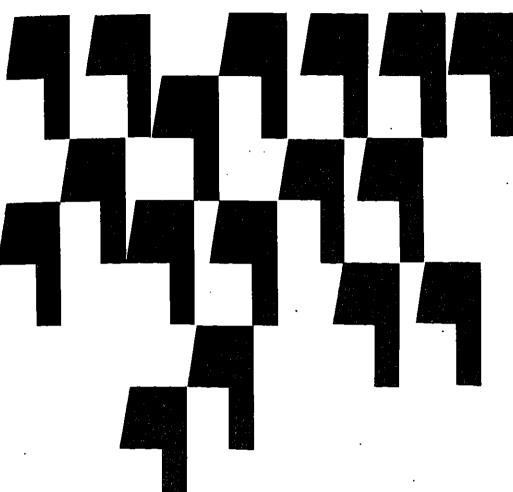
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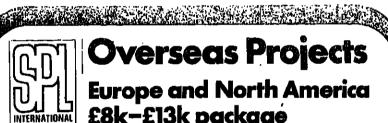
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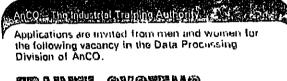
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# to present that glossy brochure

one is supplying a range of marketing environment across the whole spectrum of the computer industry, comparisons are inevitable. sympathetic environment when I will telephone you

A particular area in which one is exposed to extremes of taste and judgement is sales literature. Within the scope of a small number of computer companies one can witness a myriad of possibilities from the gaudy, banal and pointless to the

I often wonder how some salesman. material ever got as far as and fallure to fulfil the basic function of an effective sales aid.

the single act of: "It's about whom we are completely sales literature, see what our advertising people can pre-empts the sales argu- or words to that effect.

Certainly, I have known buyer's unique situation. many situations where The salesman is imthere has been no real in- mediately in a defensive marketing personnel be- very call itself rather than sales literature and the product to the client. receipt of the completed.

The creation of sales dialogue becomes locked inaspects of sales manage- communication rather than ment, cannot be effective if

t is carried out in a vacuum. There are so many benefits to be gained from har-nessing the objective and creative capabilities of sales and marketing people, both in the field and in the office, that it is essential to solicit their ideas and opinions;

How should it look? How should it be

The answer to the latter question is less complex than the first, so I will start with that one.

The main function of sales literature is to confirm a sales story which has derangement problem, a h = a(h), there are D'(n) also be used to emphasise a particular point within the sales story; but care should be taken not to hand over the material to the client until the sales presentation

This is no better a method of pre-empting the major features of the sales story, no surer way of losing the collection in property of the sales story of losing the collection in property of the sales story of losing the collection in property of the number of and D'(1) = 0, D'(2) = 0, D'(3) = D'(3) = 0. If D(n) is the number of and  $D'(n) = (n-2) \times D'(n-1)$  of the number of and  $D'(n) = (n-2) \times D'(n-1)$ . of surer way or losing the client's attention, no more derangements of order n,  $+(n-2) \times D'(n-1)$  reliable a device for becoming side-tracked than then  $D(n) = (n-1) \times D(n-1)$ . Evidently, D'(n) = D(n-1) allowing the potential buyer  $+(n-1) \times D(n-2)$ , with the to get his hot little hands on initial conditions D(1) = 0. Thus the number of a nice shiny sales broth D(2) = 1. In the present double derangements of problem, a double derangement of order n, given by  $D(n) \times D(n) = 0$ .

IN a job like mine where man's "biased" argument is a personal letter which when he can see the product can limit the dialogue to the services within a sales and for himself and make his bare essentials, i.e.: "This is own decisions? So sales- who we are, this is what we men, beware! do (perhaps including some Sometimes sales litera - reference sells!), this is why ture can be used to create a you should see me, this is

> within which the salesman for our appointment. can justify an initial sales No details, just bold call; but this is a very risky statements. One piece of sales literature that can More often than not, mailing sales literature has "zap" to a first contact letthe opposite effect to the ter is a corporate brochure one intended. That is: it be- of financial report.

tasteful. succinct and comes a justification for the Such documents tend to client refusing to see the be primarily devoted to the "Who we are" rather than "I've read your brochure the "What we do" and the printing press, such is and consequently have a therefore have much less the appalling presentation good appreciation of your risk of destroying the salesproducts. If we ever want man's pitch. any we'll let you know" or The salesman must en-

"It is clear that your pro- sure that the qualification of One can only assume that ducts and prices are very a prospect's potential busiin such cases the total pro- similar to those we are ness is within his control cess of generation and already receiving from an rather than the client's. This evaluation is embraced in other supplier and with is where effective "deskprospecting" is essential. This action once again ture is, in effect, passing cess over to the client. ment and the application of

the potential buyer is typically a very busy man - who already finds it difficult volvement by sales and situation, justifying the to get all his jobs done in the time available without the tween the initial demand for the direct benefits of the added pressure of seeing This situation is not only him something he has been article by salesmen in the unsatisfactory but also able to manage without up doubly difficult because to now.

It is much easier to say no literature, like so many to written and telegraphic to a piece of paper than a salesman — usually!

Always bear in mind that

TRADER

## PRODUCT NOTES

the frame

## Graphics VDU

whilst at the same time ensuring that the "horse", that is being designed does not become a "camel" as a result.

There are two primary considerations to be made in the context of sales literature:

The same time ensuring the same time ensuring that the "horse", that is being designed does not be man application area for the 3977 graphics display unit now available from Siemens.

The 3977 comprises a minicomputer controller and up to four monitors can be used to select and examine

to precede the first sales cal

benefits to the potential

used to select and examin any parts of a particular graphics frame in detail using

The operator can also add to the contents of the screen interactively using a key-board and light pen. Software provided by Siemens with the 3977 enables graphics symbols and images to be created and stored in an image data-

Siemens AG, (CW), Postfach 3240, D-8520 Erlangen 2, West Germany. Tel: (9131) 73394.

secondary derangements

 $a(h) \rightarrow b(h)$ . Now  $b(n) \neq n$ , and  $b(n) \neq n$ 

a(n), so that b(n) can only

b(h) = h it is a D'(n-2) de-

## Puzzle Answer

already been told. It can derangement of the natural order of n objects (integers) 1, 2, 3, ...., n-1, n is given by a(1), a(2), a(3), ..., a(n-1), a(n), so that b(n) can only a(n) with a(h)  $\neq$ h. Now interchange a(n) with one of 2) possible symbols, say the (n-1) possible symbols, b(h). If b(h)  $\neq$  h, this is a say a(h). If a(h)  $\neq$  n, this is a D'(n-1) derangement, but if b(h)  $\Rightarrow$  h it is a D'(n-2) de-

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## Block 20 (Blockhead)

Having disputened Ascii on a ao-or-dle mission to Fort Ranfour with Dr Null's contagious gigolic induction program embedded in his microcode. Hex rejoins his fellow outlaws at Sprocket's Hole. In the small hours his repose is shattered by a signal on his personal radio. Simula is trying to make contact.
"HEX? Are you receiving me?" came Simula's inquiring

voice again, crystal-clear through the ether.

Receiving you loud and clear. Over. There was a crackle of static, then her reply: "I can't hear you too well. Can you increase the power of your trans-

Hex hesitated. His transmitter was for local use as a walkie-talkie in and around Base 16. So was hers, but evidently she had got hold of an amplifier. If there was one hing the System would like, it was a nice strong radio beam

He looked around at his companions asleep on the wooden floor. To give away his own position was bad enough, but if he were caught they would fall with him.

If it had been Fetch or Execute, he might have suspected a trick and shut up. But Simula? Surely she was incapable of treachery. His reply went out at normal strength: "What is

"Listen," she responded instantly, "I still can't hear you very well, but this is an emergency. I'm being held captive at Fort Ranfour. They want to use me to lure you in. I must warn you: don't come even if I ask you. Do you under-

"What do you mean?"

"Don't on any account listen to any further broadcasts I make. They may torture me and I may agree to ask you to meet me somewhere; but IGNORE it! OK?"

"Torture you?" Hex's mind was reeling.
"It's no good," she said, "I still can't hear you clearly. Just

remember what I've said. Don't listen to me after tonight, no matter what. Bye, Hex. Good luck."

Hex boosted his transmitter to full power. "Simula!

"No. It's not safe to go on. Someone might cavesdrop

"Simula, I have to tell you something too. Don't go yet."



He switched off his FM set. This bolt from the blue had stirred up a gaggle of unresolved questions; but none more insistent than this: Why did he have the receiver on in the first place? Why, since leaving Base 16, had he kept that channel permanently open? There was really only one

He rose to his feet, careful not to disturb the other sleepers. He could see only one way ahead. Simula had warned him not to contact her; but he hadn't had time to tell her that Ascli was on his way, primed to destroy Fort Ranfour. As soon as Ascii arrived the whole System would go gigotic, and in that conflagration Simula would unubtedly perish. He owed it to her: he must go to Fort Ranfour and bring her out alive.

He tiptoed outside. It was another sharp cool desert night. The stars were precise pinpoints. He felt wide awake and raring to go. He walked away from his comrades with

no real thought for the consequences of his action. His mind turned to Cleo. At 16, he decided, she was just too young. He was 55 and though in terms of the android life expectancy of 255 years and he was still a stripling (hence his nickname, the Hexadecimal Kid) it made him too old for her. She had plenty of spirit, all right: she was a plucky girl. The trouble with Cleo was that she was too possessive. She was very stubborn about not getting cybernated too. She had a pathological phobia of all things electronic. All she wanted was to settle down on some reservation — free from interference by the Information Society — and raise a family. It was not a prospect he could

share with any enthusiasm The first hint of dawn tinged the sky. He quickened his rather leisurely pace. Fort Ranfour was near San Jose. The quickest way was to head north through Silicon Valley;. That meant crossing the ruins of the human reservation

When it grew light he left the road and made his way across rough country. In the early afternoon he came to the desolate reservation. He was amazed to find that the humans were back - a few of them anyway. In the centre of the ghost town some tents had been erected, and the smoke from a cooking fire was curling lazily into the air. You had to give these humans full marks for tenacity: like . rats, it was hard to keep them down for long.

He gave them a wide berth. A lone android could expect no mercy after their treatment at the hands of the Night Operators. He didn't want them venting their spieen on him. So his path led, skirting the city, to the wooded hillock where he had buried his father, Abraham Synapse. It

seemed more than one lifetime ago.

Feeling in a contemplative mood, he scratched about turning over the fallen leaves with a stick; but he could find no sign of the grave. Professor Synapse (or Dr Null, as he still thought of him) had returned to the earth.

He sat down and reviewed events since he had last been there. The System circulated horrific tales of datastarvation, but they were largely bogus. Now that he had written a neat little forgetting algorithm he had had no more trouble with directory overflows, and his average access time was greatly reduced. Of course he had to lose certain trivial details, but he had come to prefer it that way.

Forgetting, he concluded, was very important. The uncritical hoarding of information was a great handleap. If the Database could only renounce its miserly attitude towards data, half its problems would disappear overnight. After all, everyone knew that data expands to fill the storage allotted to it.



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